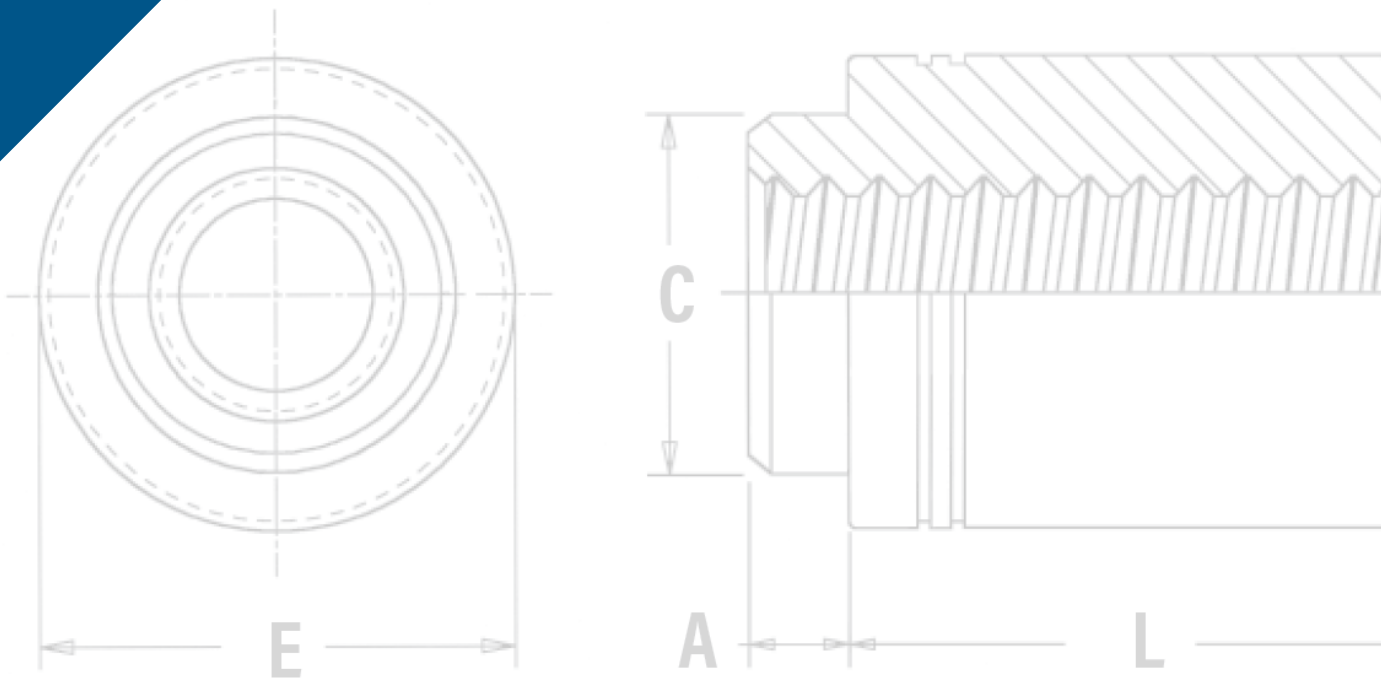
PEM® brand fasteners that utilize, surface-mount, broaching and flaring technology for use with PC boards

# K™

# FASTENERS FOR USE WITH PC BOARDS



# FASTENERS FOR USE WITH PC BOARDS

No matter how sophisticated or advanced, electronic components must be attached reliably and securely if they are to deliver optimum performance. We offer several fastener products for use with PC boards to satisfy component-to-board, board-to-board, and board-to-chassis attachment needs.

**ReelFast® surface mount fasteners** mount on PC boards in the same manner and at the same time as other surface mount components prior to the automated reflow solder process. The fasteners simply become another board component. This alleviates concerns about potential damage to PC boards due to improper secondary installation operations. The fasteners are provided on tape and reel compatible with existing SMT automated installation equipment. The benefits of using ReelFast® SMT fasteners are: faster assembly; reduced scrap; reduced handling; and reduced risk of board damage.

**Broaching fasteners** can also offer practical alternatives to "loose" hardware. A broaching fastener is a knurled-shank fastening device that can be pressed into a hole to provide a permanent, strong, threaded or unthreaded attachment point in PC boards. They can also be used in aluminum, acrylic, casting and polycarbonate components. Specially formed axial grooves around the shank of the fastener "broach" or cut into the material, creating a firm, interference-type fit resistant to rotation. In PC boards, broaching fasteners are recommended for use in non-plated holes.

**Broach/flare-mount standoffs** (KFB3™) offer a combined broach/flare feature for even greater pullout performance in PC board materials.

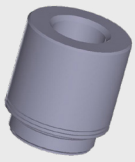
## QUICK REFERENCE CHART

| PEM® Fastener | Page No. | Mounting Types | | | | Primary Use | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Broach | Broach/ Flare | Surface Mount | Clinch/ Broach | Nut | Spacer/ Standoff | Snap Attachment | Stud | Captive Screw | Color Coding | Right Angle Attachment | Sheet to Sheet Joining |
| SMTSO/SMTSOB | 4 | | | ▪ | | ▪ | ▪ | | | | | | |
| SMTSS | 5 | | | ▪ | | | ▪ | ▪ | | | | | |
| SMTSK | 6 | | | ▪ | | | ▪ | | | | | | |
| KF2/KFS2 | 7 | ▪ | | | | ▪ | | | | | | | |
| KFE/KFSE | 8 | ▪ | | | | | ▪ | | | | | | |
| KFB3 | 8 | | ▪ | | | | ▪ | | | | | | |
| KSSB | 9 | ▪ | | | | | ▪ | ▪ | | | | | |
| SMTPFLSM | 10 | | | ▪ | | | | | | ▪ | | | |
| SMTPF | 11 | | | ▪ | | | | | | ▪ | ▪ | | |
| PFK | 12 | ▪ | | | | | | | | ▪ | | | |
| KFH | 12 | ▪ | | | | | | | ▪ | | | | |
| SMTRA | 13 | | | ▪ | | | | | | | | ▪ | |
| SFK | 14 | | | | ▪ | | | | | | | | ▪ |


## PEM® TRADEMARKS

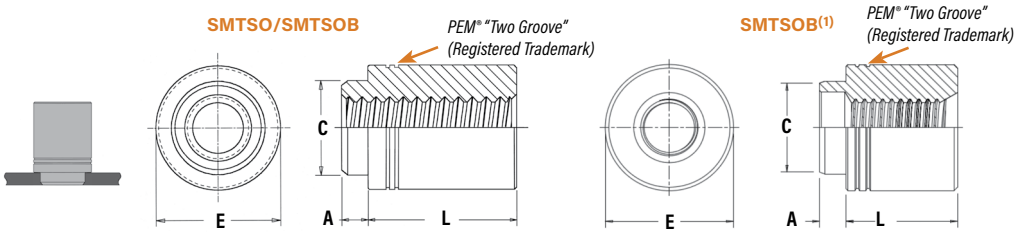



**To be sure that you are getting genuine PEM® brand fasteners, look for the unique PEM® product markings and identifiers.**



Fastener drawings and models are available at www.pemnet.com

# SMTSO™/SMTSOB™ ReelFast® SURFACE MOUNT NUTS AND SPACERS/STANDOFFS

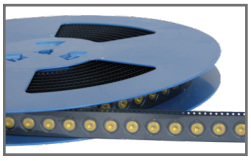


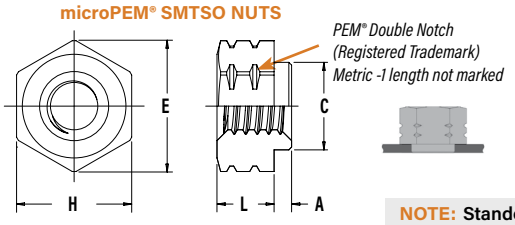

## PART NUMBER DESIGNATION

SMTSO - 440 - 8 ET
SMTSOB - 440 - 8 ET

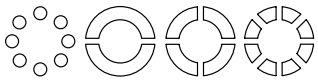
- Type and Material
- Thread or Thru Hole Code
- Length Code
- Finish

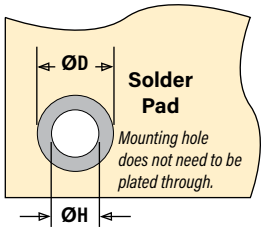
Thread/thru hole sizes 2-56, 4-40, 6-32, 8-32, 116, 143, M2, M2.5, M3, M3.5, M4, 3.1, 3.6, and 4.2






Thread sizes 080, S1, S1.2, S1.4 and M1.6




**NOTE:** Standoffs are available on special order without a pilot that do not require a thru hole for installation. Contact techsupport@pemnet.com for more information

**All dimensions are in inches.**

| | Thread Size | Thru Hole +.004 -.003 | Type: Fastener Material: Steel | Type: Fastener Material: Brass | Thread or Thru Hole Code | Length Code "L" ±.005 (Length code in 32nds of an inch): .062 | .125 | .250 | .375 | Min. Sheet Thickness | A Max. | C Max. | E: Ref. | E: ±.005 | H Nom. | ØH Hole Size In Sheet +.003 -.000 | ØD Min. Solder Pad |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNIFIED | .060-80 (#0-80) | – | SMTSO | – | 080 | 2 | 4 | – | – | .020 | .019 | .095 | .144 | | .125 | .098 | .165 |
| | .086-56 (#2-56) | – | SMTSO | SMTSOB | 256 | 2 | 4 | 8 (1) | 12 (1) | .060 | .060 | .142 | – | .219 | – | .147 | .244 |
| | .112-40 (#4-40) | – | SMTSO | SMTSOB | 440 | 2 | 4 | 8 (1) | 12 (1) | .060 | .060 | .161 | – | .219 | – | .166 | .244 |
| | .138-32 (#6-32) | – | SMTSO | SMTSOB | 632 | 2 | 4 | 8 (1) | 12 (1) | .060 | .060 | .208 | – | .281 | – | .213 | .306 |
| | .164-32 (#8-32) | – | SMTSO | SMTSOB | 832 | 2 | 4 | 8 (1) | 12 (1) | .060 | .060 | .245 | – | .344 | – | .250 | .369 |
| | – | .116 | SMTSO | SMTSOB | 116 | 2 | 4 | 8 | 12 | .060 | .060 | .161 | – | .219 | – | .166 | .244 |
| | – | .143 | SMTSO | SMTSOB | 143 | 2 | 4 | 8 | 12 | .060 | .060 | .208 | – | .281 | – | .213 | .306 |

**All dimensions are in millimeters.**

| | Thread Size x Pitch | Thru Hole +0.10 -0.08 | Type: Fastener Material: Steel | Type: Fastener Material: Brass | Thread or Thru Hole Code | Length Code "L" ±0.13 (Length code in millimeters) | | | | | | | Min. Sheet Thickness | A Max. | C Max. | E: Ref. | E: ±0.13 | H Nom. | ØH Hole Size In Sheet +0.08 | ØD Min. Solder Pad |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METRIC | S1 | – | SMTSO | – | M1 | 1 | 2 | 3 | – | – | – | – | 0.5 | 0.48 | 2.41 | 3.66 | – | 3.18 | 2.5 | 4.19 |
| | S1.2 | – | SMTSO | – | M1.2 | 1 | 2 | 3 | – | – | – | – | 0.5 | 0.48 | 2.41 | 3.66 | – | 3.18 | 2.5 | 4.19 |
| | S1.4 | – | SMTSO | – | M1.4 | 1 | 2 | 3 | – | – | – | – | 0.5 | 0.48 | 2.41 | 3.66 | – | 3.18 | 2.5 | 4.19 |
| | M1.6 x 0.35 | – | SMTSO | – | M1.6 | 1 | 2 | 3 | – | – | – | – | 0.5 | 0.48 | 2.41 | 3.66 | – | 3.18 | 2.5 | 4.19 |
| | M2 x 0.4 | – | SMTSO | SMTSOB | M2 | – | 2 | 3 | 4 (1) | 6 (1) | 8 (1) | 10 (1) | 1.53 | 1.53 | 3.6 | – | 5.56 | – | 3.73 | 6.2 |
| | M2.5 x 0.45 | – | SMTSO | SMTSOB | M25 | – | 2 | 3 | 4 (1) | 6 (1) | 8 (1) | 10 (1) | 1.53 | 1.53 | 4.09 | – | 5.56 | – | 4.22 | 6.2 |
| | M3 x 0.5 | – | SMTSO | SMTSOB | M3 | – | 2 | 3 | 4 (1) | 6 (1) | 8 (1) | 10 (1) | 1.53 | 1.53 | 4.09 | – | 5.56 | – | 4.22 | 6.2 |
| | M3.5 x 0.6 | – | SMTSO | SMTSOB | M35 | – | 2 | 3 | 4 (1) | 6 (1) | 8 (1) | 10 (1) | 1.53 | 1.53 | 5.28 | – | 7.14 | – | 5.41 | 7.77 |
| | M4 x 0.7 | – | SMTSO | SMTSOB | M4 | – | 2 | 3 | 4 | 6 (1) | 8 (1) | 10 (1) | 1.53 | 1.53 | 6.22 | – | 8.74 | – | 6.35 | 9.37 |
| | – | 3.1 | SMTSO | SMTSOB | 3.1 | – | 2 | 3 | 4 | 6 | 8 | 10 | 1.53 | 1.53 | 4.09 | – | 5.56 | – | 4.22 | 6.2 |
| | – | 3.6 | SMTSO | SMTSOB | 3.6 | – | 2 | 3 | 4 | 6 | 8 | 10 | 1.53 | 1.53 | 5.28 | – | 7.14 | – | 5.41 | 7.77 |
| | – | 4.2 | SMTSO | SMTSOB | 4.2 | – | 2 | 3 | 4 | 6 | 8 | 10 | 1.53 | 1.53 | 6.22 | – | 8.74 | – | 6.35 | 9.37 |

*(1) SMTSOB fasteners with this length code have a shank counterbore.*

## NUMBER OF PARTS PER REEL / PITCH (MM) FOR EACH SIZE

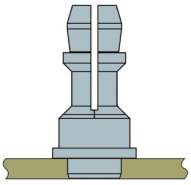
| Thread/Thru-Hole Size | Length Code: 1 | 2 | 3 | 4 | 6 | 8 | 10 | 12 |
|---|---|---|---|---|---|---|---|---|
| 080 | – | 3500 / 8 | – | 2000 / 8 | – | – | – | – |
| 256, 440, 632, 116, 143 | – | 1500 / 12 | – | 1000 / 12 | – | 650 / 12 | – | 300 / 16 |
| 832 | – | 1100 / 16 | – | 800 / 16 | – | 500 / 16 | – | 300 / 16 |
| M1, M1.2, M1.4, M1.6 | 3500 / 8 | 2500 / 8 | 2000 / 8 | – | – | – | – | – |
| M2, M25, M3, M35, 3.1, 3.6 | – | 1500 / 12 | 1000 / 12 | 900 / 12 | 650 / 12 | 375 / 16 | 300 / 16 | – |
| M4, 4.2 | – | 1100 / 16 | 800 / 16 | 675 / 16 | 500 / 16 | 375 / 16 | 300 / 16 | – |

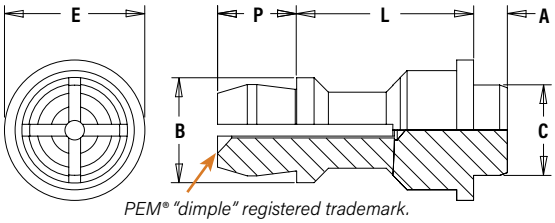
*Packaged on 330 mm recyclable reels. Tape width is 24 mm. Reels conform to EIA-481.*

*A polyimide patch is supplied to allow for reliable vacuum pickup. Fasteners are also available without a patch which may provide a lower cost alternative, depending on your installation methods/requirements.*

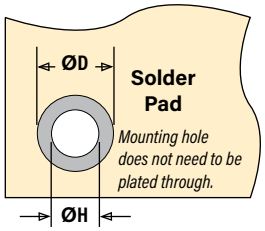
## SMTSS™ REELFAST® SNAP-TOP® STANDOFFS

***NOTE:*** ***REELFAST® SNAP-TOP® SMTSS™ standoffs are for on-only applications. For removal applications, mounting hole A can be increased to reduce removal force.***






*PEM® "dimple" registered trademark.*

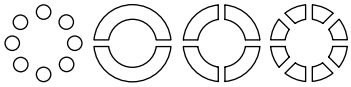



### PART NUMBER DESIGNATION

SMTSS S - 156 - 12 ET

- SMTSS: Type
- S: Material
- 156: Top Board Mounting Hole A Diameter Code
- 12: Length Code
- ET: Finish

### Stencil Masking Examples



**All dimensions are in inches.**

| | Top Board Mounting Hole A Diameter Code | Type and Material | Length Code "L" ±.005 (Length Code in 32nds of an inch) | | Min. Sheet Thickness | A Max. | C Max. | E ±.005 | B ±.005 | P ±.005 | ØH Hole Size in Sheet +.003 -.000 | ØD Min. Solder Pad |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | .250 | .375 | | | | | | | | |
| UNIFIED | 156 | SMTSSS | 8 | 12 | .060 | .060 | .161 | .250 | .188 | .141 | .166 | .276 |

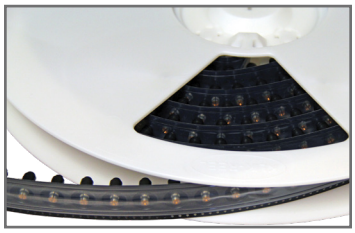
**All dimensions are in millimeters.**

| | Top Board Mounting Hole A Diameter Code | Type and Material | Length Code "L" ±0.13 (Length Code in millimeters) | | | Min. Sheet Thickness | A Max. | C Max. | E ±0.13 | B ±0.13 | P ±0.13 | ØH Hole Size in Sheet +0.08 | ØD Min. Solder Pad |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METRIC | 4MM | SMTSSS | 6 | 8 | 10 | 1.53 | 1.53 | 4.09 | 6.35 | 4.8 | 3.58 | 4.22 | 7 |

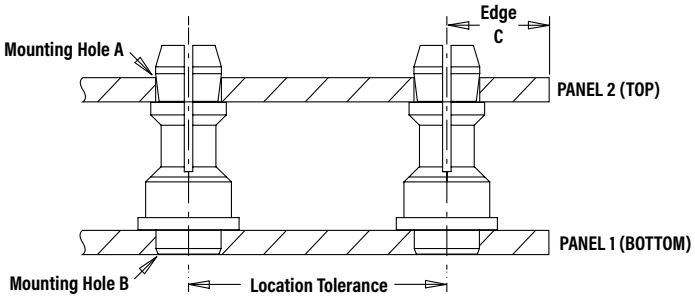
## NUMBER OF PARTS PER REEL

| Type, Material and Size | Length Code / Number of Parts per Reel | | |
|---|---|---|---|
| SMTSSS-156 | -8 / 280 | -12 / 220 | |
| SMTSSS-4MM | -6 / 300 | -8 / 250 | -10 / 200 |

*Packaged on 330 mm recyclable reels. Tape width is 24 mm.*
*Supplied with polyimide patch for vacuum pick up. Reels conform to EIA-481.*



## SMTSS™ APPLICATION DATA




**All dimensions are in inches.**

| | | Panel 1 | | | | | Panel 2 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Type | Hardness Max. | Bottom Mounting Hole B +.003 -.000 | Panel Material | Thickness Min. | Location Tolerance | Hardness Max. | Top Mounting Hole A +.003 -.000 | Panel Material | Thickness Range | Edge Distance C Min. |
| UNIFIED | SMTSS | No Limit | .166 | PC board | .060 | ±.005 | No Limit | .156 | PC board or Metal | .040 - .070 | .100 |

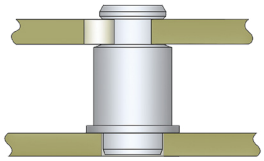
**All dimensions are in millimeters.**

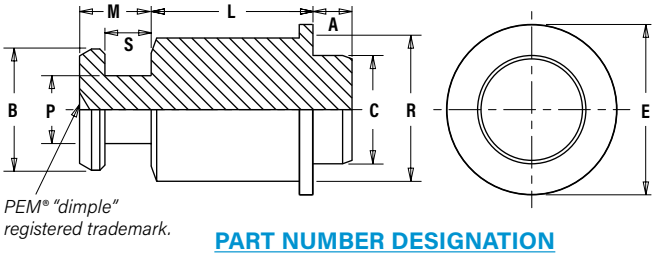
| | | Panel 1 | | | | | Panel 2 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Type | Hardness Max. | Bottom Mounting Hole B +0.08 | Panel Material | Thickness Min. | Location Tolerance | Hardness Max. | Top Mounting Hole A +0.08 | Panel Material | Thickness Range | Edge Distance C Min. |
| METRIC | SMTSS | No Limit | 4.22 | PC board | 1.53 | ±0.13 | No Limit | 4 | PC board or Metal | 1 - 1.8 | 2.54 |

## SMTSK™ REELFAST® KEYHOLE® STANDOFFS

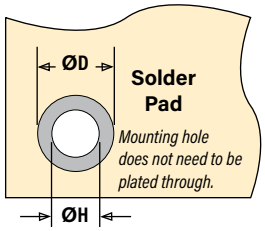
NEW

- Unique barrel design allows for quick attachment and detachment.
- Makes horizontal or vertical component mounting possible.






PEM® "dimple" registered trademark.

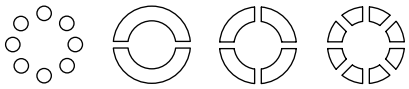



### PART NUMBER DESIGNATION

SMTSK - 6 060 - 12 ET

- SMTSK: Type
- 6: Body Size Code
- 060: Sheet Thickness
- 12: Length Code
- ET: Finish

### Stencil Masking Examples



All dimensions are in inches.

| | Type | Body Size - Sheet Code | Length "L" ± .005 (Length Code in 32nds of an inch) | | | Min. Sheet Thickness | A Max. | C Max. | E ±.005 | B ±.003 | P ±.003 | R Max. | S ±.003 | M Max. | ØH Hole Size in Sheet +.003 -.000 | ØD Min. Solder Pad |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNIFIED | | | .125 | .250 | .375 | | | | | | | | | | | |
| | SMTSK | 6060 | 4 | 8 | 12 | .060 | .060 | .161 | .250 | .177 | .099 | .212 | .068 | .108 | .166 | .276 |

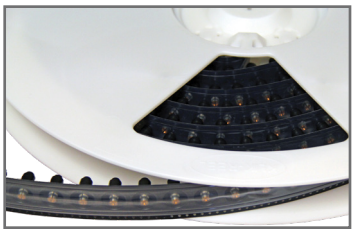
All dimensions are in millimeters.

| | Type | Body Size - Sheet Code | Length "L" ± 0.13 (Length Code in millimeters) | | | | | Min. Sheet Thickness | A Max. | C Max. | E ±0.13 | B ±.0.08 | P ±0.08 | R Max. | S ±0.08 | M Max. | ØH Hole Size in Sheet +0.08 | ØD Min. Solder Pad |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METRIC | SMTSK | 61.5 | 3 | 4 | 6 | 8 | 10 | 1.53 | 1.53 | 4.09 | 6.35 | 4.5 | 2.51 | 5.39 | 1.73 | 2.75 | 4.22 | 7 |

## NUMBER OF PARTS PER REEL

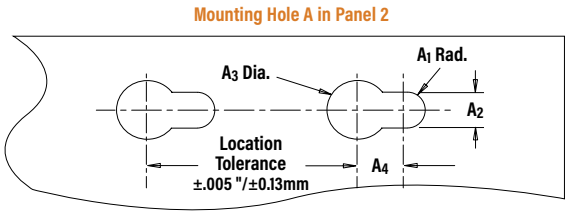
| Part Number | Length Code "L" | | |
|---|---|---|---|
| | .125 | .250 | .375 |
| SMTSK-6060 | 4 | 8 | 12 |
| | 630 | 440 | 230 |

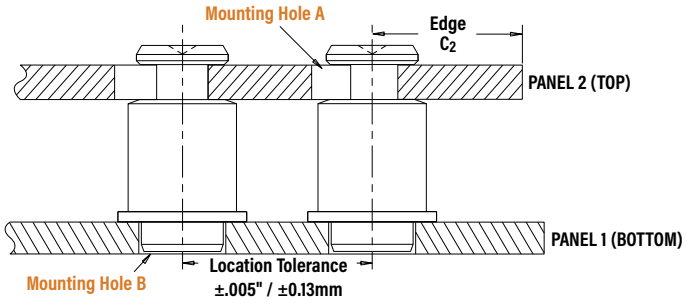
| Part Number | Length Code "L" | | | | |
|---|---|---|---|---|---|
| SMTSK-61.5 | 3 | 4 | 6 | 8 | 10 |
| | 640 | 540 | 440 | 260 | 220 |



*Packaged on 13" recyclable reels. Tape width is 24mm and 16mm. Pitch is 16mm and 12mm. Reels conform to EIA-481.*

## APPLICATION DATA




All dimensions are in inches.

| | Type | Panel 1 | | | | | Panel 2 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Hardness Max. | Bottom Mounting Hole B +.003 -.000 | Panel Material | Thickness Min. | Location Tolerance | Top Mounting Hole A | | | | Panel Material | Thickness Range | Edge Distance $C_2$ Min. |
| | | | | | | | $A_1$ Nom. | $A_2$ ±.003 | $A_3$ ±.003 | $A_4$ Min. | | | |
| UNIFIED | SMTSK | No Limit | .166 | PC board | .060 | ±.005 | .059 | .118 | .197 | .148 | ANY | .057 - .064 | .160 |

All dimensions are in millimeters.

| | Type | Panel 1 | | | | | Panel 2 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Hardness Max. | Bottom Mounting Hole B +0.08 | Panel Material | Thickness Min. | Location Tolerance | Top Mounting Hole A | | | | Panel Material | Thickness Range | Edge Distance $C_2$ Min. |
| | | | | | | | $A_1$ Nom. | $A_2$ ±0.08 | $A_3$ ±0.08 | $A_4$ Min. | | | |
| METRIC | SMTSK | No Limit | 4.22 | PC board | 1.53 | ±0.13 | 1.5 | 3 | 5 | 3.75 | ANY | 1.45 - 1.62 | 4.1 |

## NOTE ABOUT PLATED AND UNPLATED MOUNTING HOLES FOR BROACHING FASTENERS

Broaching and broach/flare types are designed for unplated mounting hole applications. If used in plated mounting holes, the stresses involved can damage the plating, push out the plating entirely, or break any traces inside the board that might be connected to the plated hole. When installing into non-plated mounting holes there may even be issues with delamination, measeling or crazing in some instances.

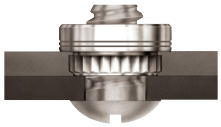
Increasing the mounting hole size +.005" to +.008" /+0.13 mm to +0.2 mm may relieve these conditions. If increasing the mounting hole does not correct the issue then we recommend our surface-mount type fasteners.

It is always recommended that you try the fasteners in your specific application before full production begins. We are happy to provide samples for this purpose.

General recommendations for "Keep Out" areas are the same as our "Min. Distance Hole C/L to Edge" dimensions stated in the dimensional charts of our bulletin.

## KF2™/KFS2™ BROACHING NUTS

- Can be used in aluminum, acrylic, casting and polycarbonate components

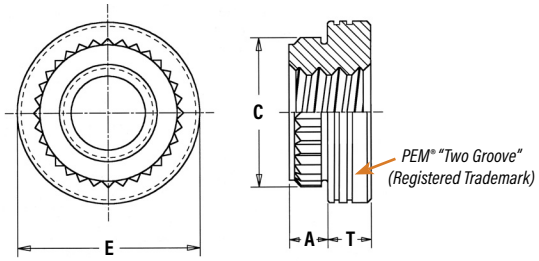


### PART NUMBER DESIGNATION

KFS2 - 832

KF2 - 832 - ET

↓ Type and Material ↓ Thread Code ↓ Finish




**All dimensions are in inches.**

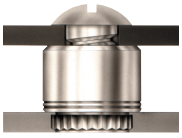
| | Thread Size | Type | | Thread Code | A (Shank) Max. | Min. Sheet Thickness | Hole Size In Sheet +.003 -.000 | C ±.003 | E ±.005 | T ±.005 | Min. Dist. Hole C/L to Edge (1) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Carbon Steel | Stainless Steel | | | | | | | | |
| UNIFIED | .086-56 (#2-56) | KF2 | KFS2 | 256 | .060 | .060 | .147 | .165 | .219 | .065 | 0.16 |
| | .112-40 (#4-40) | KF2 | KFS2 | 440 | .060 | .060 | .166 | .184 | .219 | .065 | 0.17 |
| | .138-32 (#6-32) | KF2 | KFS2 | 632 | .060 | .060 | .213 | .231 | .281 | .065 | 0.22 |
| | .164-32 (#8-32) | KF2 | KFS2 | 832 | .060 | .060 | .250 | .268 | .344 | .096 | 0.25 |
| | .190-32 (#10-32) | KF2 | KFS2 | 032 | .060 | .060 | .272 | .290 | .375 | .127 | 0.28 |

**All dimensions are in millimeters.**

| | Thread Size x Pitch | Type | | Thread Code | A (Shank) Max. | Min. Sheet Thickness | Hole Size In Sheet +0.08 | C ±0.08 | E ±0.13 | T ±0.13 | Min. Dist. Hole C/L to Edge (1) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Carbon Steel | Stainless Steel | | | | | | | | |
| METRIC | M2 x 0.4 | KF2 | KFS2 | M2 | 1.53 | 1.53 | 3.73 | 4.19 | 5.56 | 1.5 | 4.2 |
| | M2.5 x 0.45 | KF2 | KFS2 | M2.5 | 1.53 | 1.53 | 4.22 | 4.68 | 5.56 | 1.5 | 4.4 |
| | M3 x 0.5 | KF2 | KFS2 | M3 | 1.53 | 1.53 | 4.22 | 4.68 | 5.56 | 1.5 | 4.4 |
| | M4 x 0.7 | KF2 | KFS2 | M4 | 1.53 | 1.53 | 6.4 | 6.81 | 8.74 | 2 | 6.4 |
| | M5 x 0.8 | KF2 | KFS2 | M5 | 1.53 | 1.53 | 6.9 | 7.37 | 9.53 | 3 | 7.1 |

*(1) For more information on proximity to bends and distance to other clinch hardware, see PEM® Tech Sheet C/L To Edge.*

## KFE™/KFSE™ BROACHING STANDOFFS

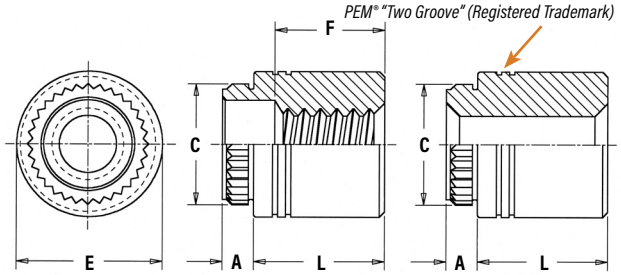


### PART NUMBER DESIGNATION

KFSE - 632 - 12

KFE - 632 - 12 - ET

- KFE / KFSE: Type and Material
- 632: Thread or Thru Hole Code
- 12: Length Code
- ET: Finish



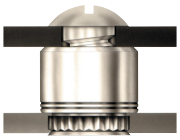

All dimensions are in inches.

| | Thread Size | Thru Hole +.004 -.003 | Type: Carbon Steel | Type: Stainless Steel | Thread or Thru Hole Code | Length "L" ±.005 (Length Code is in 32nds of an inch): .125 | .250 | .375 | .500 | .625 | (1) .750 | (1) .875 | (1) 1.00 | A (Shank) Max. | Min. Sheet Thickness | Hole Size In Sheet +.003 -.000 | C ±.003 | E ±.005 | Min. Dist. Hole C/L to Edge (2) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNIFIED | .112-40 (#4-40) | – | KFE | KFSE | 440 | 4 | 8 | 12 | 16 | 20 | 24 | – | – | .060 | .060 | .166 | .184 | .219 | .17 |
| | .138-32 (#6-32) | – | KFE | KFSE | 632 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | .060 | .060 | .213 | .231 | .281 | .22 |
| | – | .116 | KFE | KFSE | 116 | 4 | 8 | 12 | 16 | 20 | 24 | – | – | .060 | .060 | .166 | .184 | .219 | .17 |
| | – | .143 | KFE | KFSE | 143 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | .060 | .060 | .213 | .231 | .281 | .22 |
| | "F" Minimum Thread Length (Where Applicable) | | | | | Full | | | .375 ± .016 | | .375 Blind | | | | | | | | |

All dimensions are in millimeters.

| | Thread Size x Pitch | Thru Hole +0.10 -0.08 | Type: Carbon Steel | Type: Stainless Steel | Thread or Thru Hole Code | Length "L" ±0.13 (Length Code is in millimeters): 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | A (Shank) Max. | Min. Sheet Thickness | Hole Size In Sheet +0.08 | C ±0.08 | E ±0.13 | Min. Dist Hole C/L to Edge (2) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METRIC | M3 x 0.5 | – | KFE | KFSE | M3 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 1.53 | 1.53 | 4.22 | 4.68 | 5.56 | 4.4 |
| | – | 3.6 | KFE | KFSE | 3.6 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 1.53 | 1.53 | 5.41 | 5.87 | 7.14 | 5.5 |
| | – | 4.2 | KFE | KFSE | 4.2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 1.53 | 1.53 | 6.4 | 6.81 | 8.74 | 7.1 |
| | "F" Minimum Thread Length (Where Applicable) | | | | | Full | | | | | 9.5 ± 0.4 | | | | | | | | |

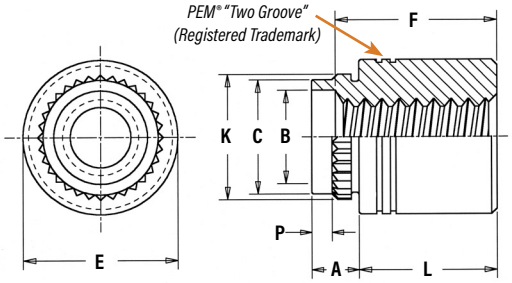
## KFB3™ BROACH/FLARE-MOUNT STANDOFFS



### PART NUMBER DESIGNATION

KFB3 - 632 - 12 - ET

- KFB3: Type and Material
- 632: Thread Code
- 12: Length Code
- ET: Finish




All dimensions are in inches.

| | Thread Size | Type | Thread Code | Length "L" ±.005 (Length Code is in 32nds of an inch): .062 | .125 | .187 | .250 | .312 | .375 | .500 | .625 | (1) .750 | (1) 1.00 | A (Shank) Max. | Sheet Thickness | Hole Size in Sheet +.005 -.001 | B ±.003 | C Max. | E ±.005 | K ±.003 | P ±.010 | Min. Dist. Hole C/L to Edge (2) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNIFIED | .112-40 (#4-40) | KFB3 | 440 | 2 | 4 | 6 | 8 | 10 | 12 | 16 | 20 | – | – | .09 | .050-.065 | .166 | .122 | .165 | .219 | .179 | .040 | .17 |
| | .138-32 (#6-32) | KFB3 | 632 | 2 | 4 | 6 | 8 | 10 | 12 | 16 | 20 | 24 | 32 | .09 | .050-.065 | .213 | .171 | .212 | .280 | .226 | .040 | .22 |
| | "F" Min. Thread Length (Where Applicable) | | | Full | | | | | | | | .375 Blind | | | | | | | | | | |

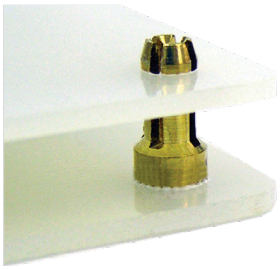
All dimensions are in millimeters.

| | Thread Size x Pitch | Type | Thread Code | Length "L" ±0.13 (Length Code is in millimeters): 2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | A (Shank) Max. | Sheet Thickness | Hole Size in Sheet +0.13 -0.03 | B ±0.08 | C Max. | E ±0.13 | K ±0.08 | P ±0.25 | Min. Dist. Hole C/L to Edge (2) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METRIC | M3 x 0.5 | KFB3 | M3 | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 2.29 | 1.27-1.65 | 4.22 | 3.23 | 4.2 | 5.56 | 4.55 | 1 | 4.33 |
| | M4 x 0.7 | KFB3 | M4 | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 2.29 | 1.27-1.65 | 6.4 | 5.23 | 6.33 | 8.74 | 6.68 | 1 | 6.36 |
| | "F" Min. Thread Length (Where Applicable) | | | Full | | | | | | 9.5 ±0.4 | | | | | | | | | | | |

*(1) Blind at shank end with .375" minimum thread length from head end.*

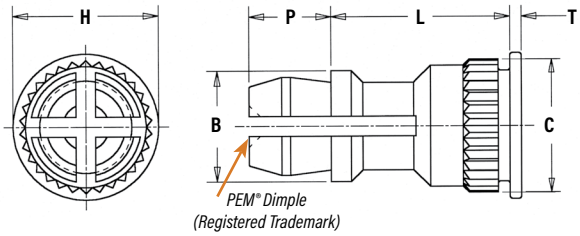
*(2) For more information on proximity to bends and distance to other clinch hardware, see PEM® Tech Sheet C/L To Edge.*

## KSSB™ BROACHING SNAP-TOP® STANDOFFS



**PART NUMBER DESIGNATION**

| KSSB | - | 156 | - | 12 | X |
|---|---|---|---|---|---|
| Type and Material | | Top Board Mounting Hole A Diameter Code | | Length Code | Finish |



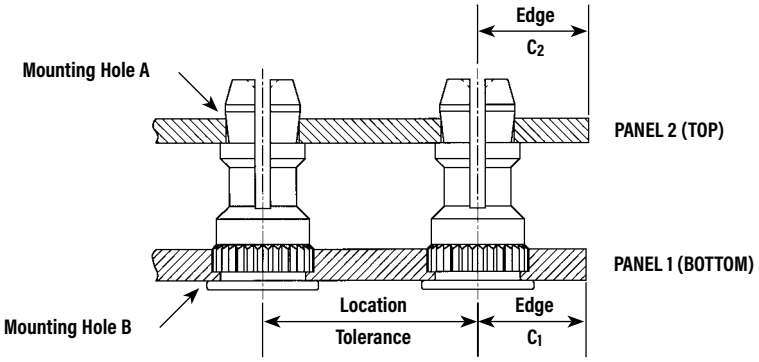

All dimensions are in inches.

| | Type | Top Board Mounting Hole A Diameter Code | Length "L" ±.005 (Length Code is in 32nds of an inch) | | | | | | | | | B ±.005 | C ±.003 | H ±.005 | P ±.005 | T ±.005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | .250 | .312 | .375 | .437 | .500 | .562 | .625 | .750 | .875 | 1.00 | | | | | |
| UNIFIED | KSSB | 156 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 24 | 28 | 32 | .188 | .226 | .250 | .141 | .020 |

All dimensions are in millimeters.

| | Type | Top Board Mounting Hole A Diameter Code | Length "L" ±0.13 (Length Code is in millimeters) | | | | | | | | | B ±0.13 | C ±0.08 | H ±0.13 | P ±0.13 | T ±0.13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METRIC | KSSB | 4MM | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 25 | 4.8 | 5.74 | 6.35 | 3.58 | 0.51 |

## KSSB™ APPLICATION DATA




All dimensions are in inches.

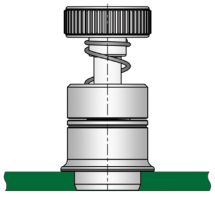
| | | Panel 1 | | | | | | Panel 2 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Type | Hardness Max. (1) | Bottom Mounting Hole B +.003 -.000 | Panel Material | Thickness Min. | Edge Distance $C_1$ Min. | Location Tolerance | Hardness Max. | Top Mounting Hole A +.003 -.000 | Panel Material | Thickness Range (2) | Edge Distance $C_2$ Min. |
| UNIFIED | KSSB | HRB 65 / HB 116 | .213 | PC board | .050 | .220 | ±.005 | No Limit | .156 | PC board or Metal | .040 - .070 | .100 |

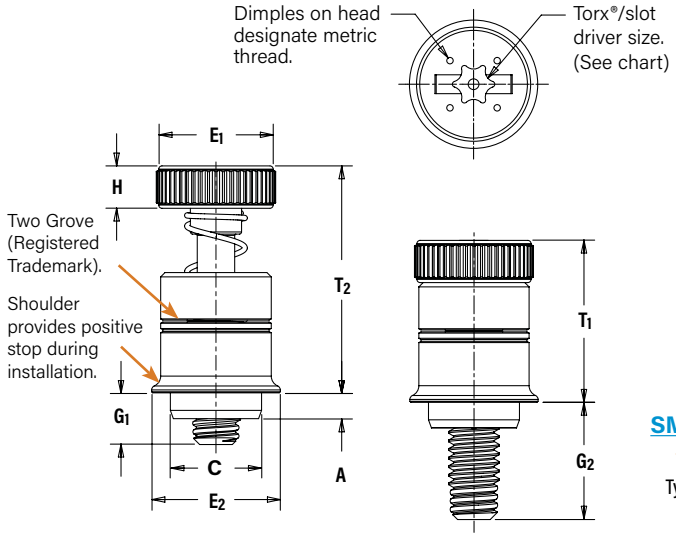
All dimensions are in millimeters.

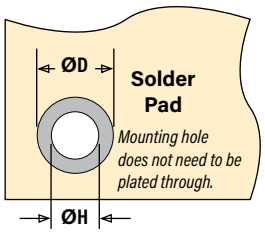
| | | Panel 1 | | | | | | Panel 2 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Type | Hardness Max. (1) | Bottom Mounting Hole B +0.08 | Panel Material | Thickness Min. | Edge Distance $C_1$ Min. | Location Tolerance | Hardness Max. | Top Mounting Hole A +0.08 | Panel Material | Thickness Range (2) | Edge Distance $C_2$ Min. |
| METRIC | KSSB | HRB 65 / HB 116 | 5.41 | PC board | 1.27 | 5.59 | ±0.13 | No Limit | 4 | PC board or Metal | 1 - 1.8 | 2.54 |

*(1) HRB - Hardness Rockwell "B" Scale. HB - Hardness Brinell.*
*(2) Available for thicker boards on special order.*

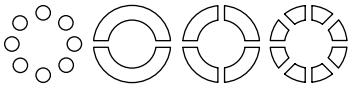
## SMTPFLSM™ ReelFast® SURFACE MOUNT CAPTIVE PANEL SCREWS






**Stencil Masking Examples**



### PART NUMBER DESIGNATION

| SMTPF | LS | M | - | 440 | - | 0 | ET |
|---|---|---|---|---|---|---|---|
| ↓ | ↓ | ↓ | | ↓ | | ↓ | ↓ |
| Type | Driver | Anti-cross Thread Feature | | Thread Code | | Length Code | Finish |

**All dimensions are in inches.**

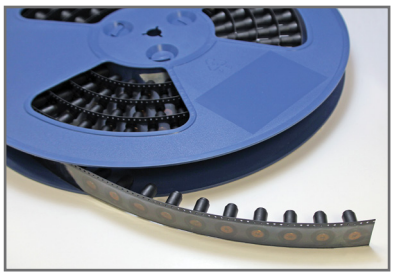
| | Thread Size | Type | Thread Code | Screw Length Code | A (Shank) Max. | Min. Sheet Thickness | C Max. | $E_1$ ±.010 | $E_2$ Nom | $G_1$ ±.025 | $G_2$ ±.025 | H ±.010 | $T_1$ Nom. | $T_2$ Nom. | ØK Hole Size in Sheet +.003 -.000 | ØD Min. Solder Pad | Driver Size |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNIFIED | .112-40 (#4-40) | SMTPFLSM | 440 | 0 | .063 | .063 | .215 | .280 | .300 | .040 | .210 | .100 | .38 | .55 | .220 | .340 | T15 |
| | | | | 1 | | | | | | .100 | .270 | | | | | | |
| | .138-32 (#6-32) | SMTPFLSM | 632 | 0 | .063 | .063 | .247 | .310 | .320 | .040 | .240 | .100 | .42 | .62 | .252 | .400 | T15 |
| | | | | 1 | | | | | | .100 | .300 | | | | | | |

**All dimensions are in millimeters.**

| | Thread Size | Type | Thread Code | Screw Length Code | A (Shank) Max. | Min. Sheet Thickness | C Max. | $E_1$ ±0.25 | $E_2$ Nom | $G_1$ ±0.64 | $G_2$ ±0.64 | H ±0.25 | $T_1$ Nom. | $T_2$ Nom. | ØK Hole Size in Sheet +0.08 | ØD Min. Solder Pad | Driver Size |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METRIC | M3 x 0.5 | SMTPFLSM | M3 | 0 | 1.6 | 1.6 | 5.46 | 7 | 7.6 | 1 | 5.3 | 2.5 | 9.6 | 14 | 5.6 | 8.6 | T15 |
| | | | | 1 | | | | | | 2.5 | 6.8 | | | | | | |
| | M3.5 x 0.6 | SMTPFLSM | M3.5 | 0 | 1.6 | 1.6 | 6.27 | 7.9 | 8.13 | 1 | 6.1 | 2.5 | 10.7 | 15.7 | 6.4 | 10.2 | T15 |
| | | | | 1 | | | | | | 2.5 | 7.62 | | | | | | |

## NUMBER OF PARTS PER REEL

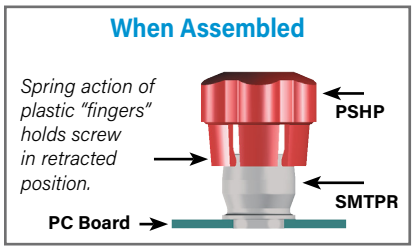
| Thread Size | Parts Per Reel |
|---|---|
| 440 | 200 |
| 632 | 150 |
| M3 | 200 |
| M3.5 | 150 |

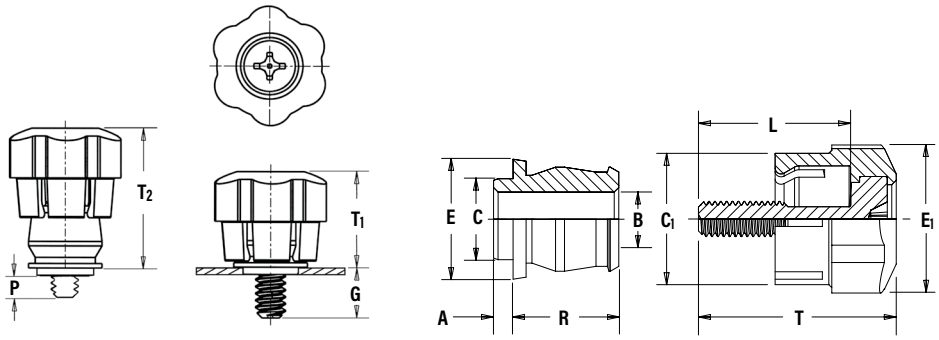


*Packaged on 330 mm recyclable reels. Tape width is 24 mm. Supplied with polyimide patch for vacuum pick up. Reels conform to EIA-481.*

## SMTPF™ ReelFast® SURFACE MOUNT CAPTIVE PANEL SCREWS

*Patented.*




**All dimensions are in inches.**

| | Thread Size | Screw Part Number: Type | Thread Code | Screw Length Code | Retainer Part Number | Assembly Dimensions: G ± .025 | P ± .025 | $T_1$ Nom. | $T_2$ Nom. | Total Radial Float | Screw Dimensions: $C_1$ ±.010 | $E_1$ ±.010 | L ±.015 | T Nom. | Retainer Dimensions: A (Shank) Max. | Min. Sheet Thick. | B ±.003 | C Max. | E Nom. | R ±.005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNIFIED | .112-40 (#4-40) | PSHP | 440 | 0 | SMTPR-6-1 | .188 | .000 | .478 | .646 | .015 | .440 | .542 | .510 | .663 | .060 | .060 | .167 | .249 | .375 | .325 |
| | | | | 1 | | .248 | .026 | | | | | | .570 | .723 | | | | | | |
| | .138-32 (#6-32) | PSHP | 632 | 0 | SMTPR-6-1 | .188 | .000 | .478 | .646 | .020 | .440 | .542 | .510 | .663 | .060 | .060 | .167 | .249 | .375 | .325 |
| | | | | 1 | | .248 | .026 | | | | | | .570 | .723 | | | | | | |

**All dimensions are in millimeters.**

| | Thread Size x Pitch | Screw Part Number: Type | Thread Code | Screw Length Code | Retainer Part Number | Assembly Dimensions: G ± 0.64 | P ± 0.64 | $T_1$ Nom. | $T_2$ Nom. | Total Radial Float | Screw Dimensions: $C_1$ ±0.25 | $E_1$ ±0.25 | L ±0.38 | T Nom. | Retainer Dimensions: A (Shank) Max. | Min. Sheet Thick. | B ±0.08 | C Max. | E Nom. | R ±0.13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METRIC | M3 x 0.5 | PSHP | M3 | 0 | SMTPR-6-1 | 4.78 | 0 | 12.14 | 16.41 | .38 | 11.18 | 13.77 | 12.95 | 16.84 | 1.53 | 1.53 | 4.24 | 6.33 | 9.53 | 8.26 |
| | | | | 1 | | 6.3 | .66 | | | | | | 14.48 | 18.36 | | | | | | |
| | M3.5 x 0.6 | PSHP | M3.5 | 0 | SMTPR-6-1 | 4.78 | 0 | 12.14 | 16.41 | .51 | 11.18 | 13.77 | 12.95 | 16.84 | 1.53 | 1.53 | 4.24 | 6.33 | 9.53 | 8.26 |
| | | | | 1 | | 6.3 | .66 | | | | | | 14.48 | 18.36 | | | | | | |

***RETAINER -*** *Packaged on 330 mm recyclable reels of 400 pieces. Tape width is 24 mm. Supplied with Kapton® patch for vacuum pick up. Reels conform to EIA-481.*

***SCREW -*** *Packaged in bags. Retainers and screws are sold separately.*

### PART NUMBER DESIGNATION FOR SCREW

PSHP - 632 - 0 L 001

- PSHP: Type
- 632: Thread Code
- 0: Length Code
- L: Cap Style (Lobed)
- 001: Color Code (Standard Black)

### PART NUMBER DESIGNATION FOR RETAINER

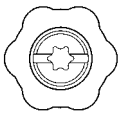
SMTPR - 6 - 1 ET

- SMTPR: Type
- 6: Retainer Size
- 1: Shank Code
- ET: Finish

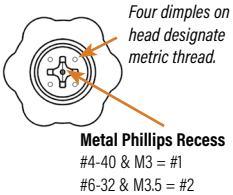
### COLOR CAPABILITIES FOR TYPE PSHP SCREW

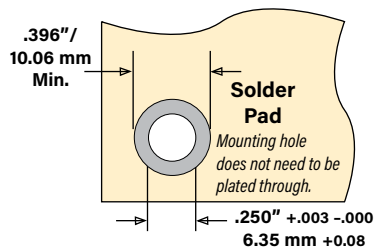
The colors shown here (codes #002 thru #007) are non-stocked standards and available on special order. Since actual cap colors may vary slightly from those shown here, we recommend that you request samples for color verification. If you require a custom color or you need a "color matched" cap, please contact us.


*Non-flammable UL 94-V0 plastic caps are available on special order.*

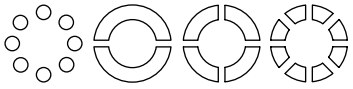


Available with Torx® recess on special order.

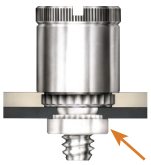



**Stencil Masking Examples**



## PFK™ BROACHING CAPTIVE PANEL SCREWS

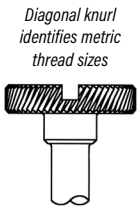


*Shown here with self-clinching mating nut*

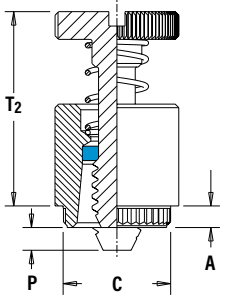
**PART NUMBER DESIGNATION**

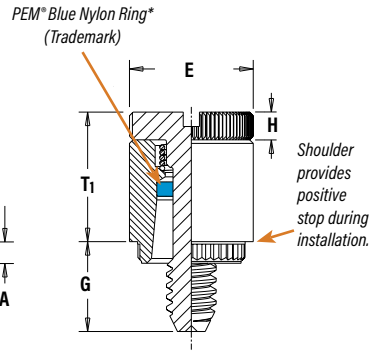
PFK - 632 - 62

PFK: Type; 632: Thread Code; 62: Screw Length Code



*Diagonal knurl identifies metric thread sizes*




**All dimensions are in inches.**

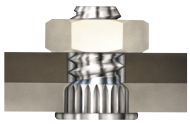
| | Thread Size | Type | Thread Code | Screw Length Code | A (Shank) Max. | Min. Sheet Thickness | Hole Size In Sheet +.003 -.000 | C ±.003 | E ±.010 | G ±.016 | H ±.005 | P ±.025 | $T_1$ Max. | $T_2$ Nom. | Min. Dist. Hole C/L to Edge (2) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNIFIED | .112-40 (#4-40) | PFK | 440 | 40 | .060 | .060 | .265 | .283 | .312 | .250 | .072 | .000 | .36 | .54 | .20 |
| | | | | 62 | | | | | | .375 | | .125 | | | |
| | | | | 84 | | | | | | .500 | | .250 | | | |
| | .138-32 (#6-32) | PFK | 632 | 40 | .060 | .060 | .281 | .299 | .344 | .250 | .072 | .000 | .36 | .54 | .26 |
| | | | | 62 | | | | | | .375 | | .125 | | | |
| | | | | 84 | | | | | | .500 | | .250 | | | |

**All dimensions are in millimeters.**

| | Thread Size x Pitch | Type | Thread Code | Screw Length Code | A (Shank) Max. | Min. Sheet Thickness | Hole Size In Sheet +0.08 | C ±0.08 | E ±0.25 | G ±0.4 | H ±0.13 | P ±0.64 | $T_1$ Max. | $T_2$ Nom. | Min. Dist. Hole C/L to Edge (2) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METRIC | M3 x 0.5 | PFK | M3 | 40 | 1.53 | 1.53 | 6.73 | 7.19 | 7.92 | 6.4 | 1.83 | 0 | 9.14 | 13.72 | 5.08 |
| | | | | 62 | | | | | | 9.5 | | 3.2 | | | |
| | | | | 84 | | | | | | 12.7 | | 6.4 | | | |

**Retaining rings are plastic with normal 250°F / 120°C temperature limit.*

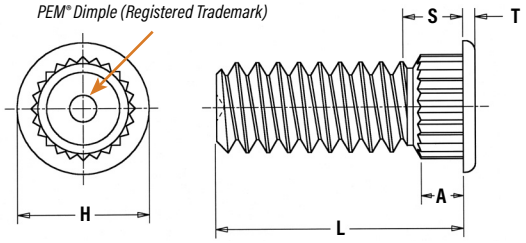
## KFH™ BROACHING STUDS



**PART NUMBER DESIGNATION**

KFH - 632 - 8 - ET

KFH: Type and Material; 632: Thread Code; 8: Length Code; ET: Finish




**All dimensions are in inches.**

| | Thread Size | Type | Thread Code | Length "L" ±.010 (Length Code is in 16ths of an inch) .250 | .312 | .375 | .500 | .625 | .750 | A (Shank) Max. | Min. Sheet Thickness | Hole Size in Sheet +.003 -.000 | Max. Hole Size in Attached Parts | H ±.010 | S Max. (1) | T ±.005 | Min. Dist. Hole C/L to Edge (2) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNIFIED | .112-40 (#4-40) | KFH | 440 | 4 | 5 | 6 | 8 | 10 | 12 | .065 | .060 | .120 | .145 | .180 | .09 | .020 | .15 |
| | .138-32 (#6-32) | KFH | 632 | 4 | 5 | 6 | 8 | 10 | 12 | .065 | .060 | .140 | .170 | .200 | .09 | .020 | .19 |
| | .164-32 (#8-32) | KFH | 832 | 4 | 5 | 6 | 8 | 10 | 12 | .065 | .060 | .166 | .195 | .225 | .09 | .020 | .20 |
| | .190-32 (#10-32) | KFH | 032 | 4 | 5 | 6 | 8 | 10 | 12 | .065 | .060 | .189 | .220 | .250 | .09 | .020 | .20 |

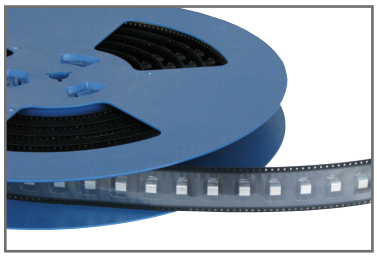
**All dimensions are in millimeters.**

| | Thread Size x Pitch | Type | Thread Code | Length "L" ±0.25 (Length Code is in millimeters) | | | | | | A (Shank) Max. | Min. Sheet Thickness | Hole Size in Sheet +0.08 | Max. Hole Size in Attached Parts | H ±0.25 | S Max. (1) | T ±0.13 | Min. Dist. Hole C/L to Edge (2) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METRIC | M3 x 0.5 | KFH | M3 | 6 | 8 | 10 | 12 | 15 | 18 | 1.65 | 1.53 | 3 | 3.7 | 4.58 | 2.3 | 0.51 | 3.8 |
| | M4 x 0.7 | KFH | M4 | 6 | 8 | 10 | 12 | 15 | 18 | 1.65 | 1.53 | 4.2 | 4.8 | 5.74 | 2.3 | 0.51 | 5.1 |
| | M5 x 0.8 | KFH | M5 | 6 | 8 | 10 | 12 | 15 | 18 | 1.65 | 1.53 | 5 | 5.8 | 6.6 | 2.3 | 0.51 | 5.3 |

*(1) Threads are gaugeable to within 2 pitches of the "S" Max. dimension. A class 3B/5H maximum material commercial nut shall pass up to the "S" Max. dimension.*

*(2) For more information on proximity to bends and distance to other clinch hardware, see PEM® Tech Sheet C/L To Edge.*

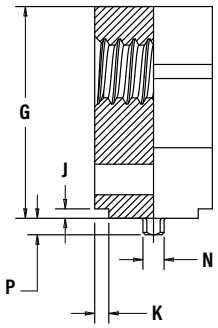
## SMTRA™ ReelFast® SURFACE MOUNT RIGHT ANGLE (R'ANGLE®) FASTENERS

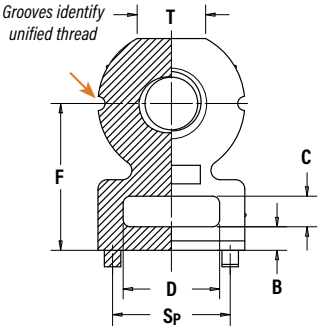


### PART NUMBER DESIGNATION

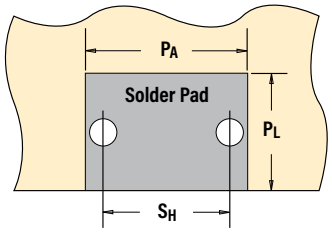
SMTRA 256 - 8 - 6 ET

| SMTRA | 256 | 8 | 6 | ET |
|---|---|---|---|---|
| Type | Thread Code | Height Code | Length Code | Finish |



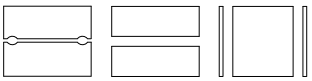



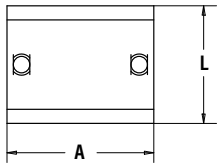

*Patented.*




*Solder pad can be flush to edge.*
*Mounting holes do not need to be plated through.*

**Stencil Masking Examples**






**All dimensions are in inches.**

| | Thread Size | Type | Thread Code | Height Code | Length Code | Length L ±.005 | Min. Sheet Thick-ness | Hole Size In Sheet +.003 -.000 | A ±.006 | B ±.006 | C ±.006 | D ±.006 | Height F ±.006 | G ±.006 | J Nom. | K Nom. | N Max. | P Max. | SP ±.003 | T Nom. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNIFIED | .086-56 (#2-56) | SMTRA | 256 | 8 | 6 | .188 | .040 | .053 | .218 | .040 | .060 | .140 | .250 | .345 | .020 | .030 | .048 | .040 | .157 | .105 |
| | .112-40 (#4-40) | SMTRA | 440 | 9 | 6 | .188 | .040 | .053 | .250 | .050 | .065 | .160 | .281 | .390 | .020 | .030 | .048 | .040 | .188 | .125 |
| | .138-32 (#6-32) | SMTRA | 632 | 10 | 8 | .250 | .040 | .053 | .312 | .050 | .065 | .205 | .312 | .450 | .020 | .030 | .048 | .040 | .250 | .145 |
| | .164-32 (#8-32) | SMTRA | 832 | 12 | 9 | .281 | .040 | .053 | .375 | .050 | .075 | .250 | .375 | .535 | .020 | .030 | .048 | .040 | .312 | .195 |

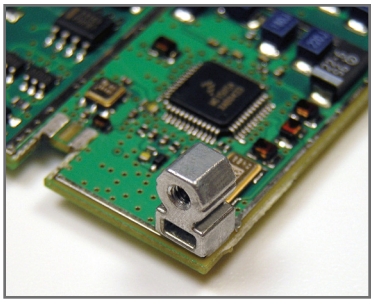
**All dimensions are in millimeters.**

| | Thread Size x Pitch | Type | Thread Code | Height Code | Length Code | Length L ±0.13 | Min. Sheet Thick-ness | Hole Size In Sheet +0.08 | A ±0.15 | B ±0.15 | C ±0.15 | D ±0.15 | Height F ±0.15 | G ±0.15 | J Nom. | K Nom. | N Max. | P Max. | SP ±0.08 | T Nom. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METRIC | M2 x 0.4 | SMTRA | M2 | 6 | 5 | 5 | 1 | 1.35 | 5.5 | 1 | 1.5 | 3.5 | 6 | 8.4 | 0.5 | 0.75 | 1.22 | 1 | 4 | 2.65 |
| | M2.5 x 0.45 | SMTRA | M25 | 6 | 5 | 5 | 1 | 1.35 | 5.5 | 1 | 1.5 | 3.5 | 6 | 8.4 | 0.5 | 0.75 | 1.22 | 1 | 4 | 2.65 |
| | M3 x 0.5 | SMTRA | M3 | 7 | 5 | 5 | 1 | 1.35 | 6.35 | 1.25 | 1.65 | 4 | 7 | 9.75 | 0.5 | 0.75 | 1.22 | 1 | 4.75 | 3.2 |
| | M4 x 0.7 | SMTRA | M4 | 9 | 7 | 7 | 1 | 1.35 | 9.53 | 1.25 | 1.65 | 6.35 | 9 | 13.1 | 0.5 | 0.75 | 1.22 | 1 | 7.9 | 4.8 |

| | Thread Code | Pad Width PA Min. | Pad Length PL Min. | Hole Spacing SH ±.002 | Hole Size In Sheet +.003 -.000 |
|---|---|---|---|---|---|
| UNIFIED | 256 | .262 | .171 | .157 | .053 |
| | 440 | .294 | .171 | .188 | .053 |
| | 632 | .356 | .233 | .250 | .053 |
| | 832 | .419 | .264 | .312 | .053 |

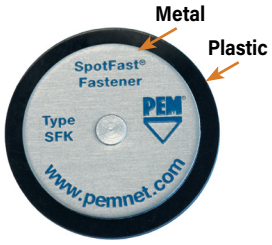
| | Thread Code | Pad Width PA Min. | Pad Length PL Min. | Hole Spacing SH ±0.05 | Hole Size In Sheet +0.08 |
|---|---|---|---|---|---|
| METRIC | M2 | 6.62 | 4.57 | 4 | 1.35 |
| | M25 | 6.62 | 4.57 | 4 | 1.35 |
| | M3 | 7.47 | 4.57 | 4.75 | 1.35 |
| | M4 | 10.65 | 6.57 | 7.9 | 1.35 |

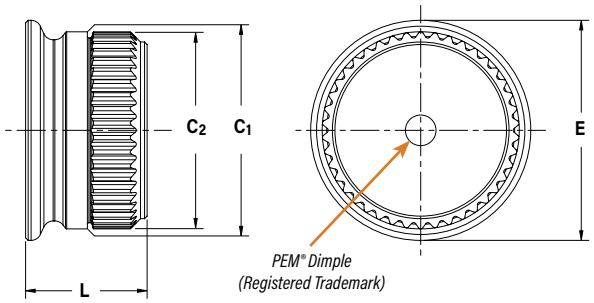
| Part Number | Parts Per Reel | Pitch (mm) | Tape Width (mm) |
|---|---|---|---|
| SMTRA256-8-6 | 375 | 16 | 24 |
| SMTRA440-9-6 | 300 | 16 | 24 |
| SMTRA632-10-8 | 200 | 20 | 32 |
| SMTRA832-12-9 | 200 | 20 | 32 |
| SMTRAM2-6-5 | 375 | 16 | 24 |
| SMTRAM25-6-5 | 375 | 16 | 24 |
| SMTRAM3-7-5 | 300 | 16 | 24 |
| SMTRAM4-9-7 | 200 | 20 | 32 |



## SFK™ SpotFast® CLINCH/BROACH MOUNT FASTENERS

*Patented.*

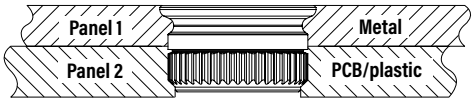



| Type and Size | Thickness Code | Panel 1 Thickness ±0.08 mm / ±.003" | | Panel 1 Mounting Hole +0.08 mm / +.003" -.000" | | Panel 2 Thickness Min. (1) | | Panel 2 Mounting Hole +0.08 mm / +.003" -.000" | | $C_1$ Max. | | $C_2$ ±0.08 mm / ±.003" | | E Max. | | L Max. | | Min. Dist. Hole C/L to Edge (2) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | mm | in. | mm | in. | mm | in. | mm | in. | mm | in. | mm | in. | mm | in. | mm | in. | mm | in. |
| SFK-3 | 0.8 | 0.8 | .031 | 3 | .118 | 1.6 | .063 | 2.5 | .098 | 2.98 | .117 | 2.9 | .114 | 3.53 | .139 | 2.31 | .091 | 3 | 0.12 |
| SFK-3 | 1.0 | 1 | .039 | 3 | .118 | 1.6 | .063 | 2.5 | .098 | 2.98 | .117 | 2.9 | .114 | 3.76 | .148 | 2.51 | .099 | 3 | 0.12 |
| SFK-3 | 1.2 | 1.2 | .047 | 3 | .118 | 1.6 | .063 | 2.5 | .098 | 2.98 | .117 | 2.9 | .114 | 3.76 | .148 | 2.72 | .107 | 3 | 0.12 |
| SFK-3 | 1.6 | 1.6 | .063 | 3 | .118 | 1.6 | .063 | 2.5 | .098 | 2.98 | .117 | 2.9 | .114 | 3.76 | .148 | 3.12 | .123 | 3 | 0.12 |
| SFK-5 | 0.8 | 0.8 | .031 | 5 | .197 | 1.6 | .063 | 4.5 | .177 | 4.98 | .196 | 4.9 | .193 | 5.56 | .219 | 2.31 | .091 | 5.1 | 0.20 |
| SFK-5 | 1.0 | 1 | .039 | 5 | .197 | 1.6 | .063 | 4.5 | .177 | 4.98 | .196 | 4.9 | .193 | 5.56 | .219 | 2.51 | .099 | 5.1 | 0.20 |
| SFK-5 | 1.2 | 1.2 | .047 | 5 | .197 | 1.6 | .063 | 4.5 | .177 | 4.98 | .196 | 4.9 | .193 | 5.56 | .219 | 2.72 | .107 | 5.1 | 0.20 |
| SFK-5 | 1.6 | 1.6 | .063 | 5 | .197 | 1.6 | .063 | 4.5 | .177 | 4.98 | .196 | 4.9 | .193 | 5.56 | .219 | 3.12 | .123 | 5.1 | 0.20 |

*(1) Fastener will provide flush application at minimum sheet thickness.*
*(2) For more information on proximity to bends and distance to other clinch hardware, see PEM® Tech Sheet C/L To Edge.*


*Can be used as a single flush-mounted pivot point. For more information, please contact techsupport@pemnet.com*




***Type SFK joining metal to PCB/plastic.***

### PART NUMBER DESIGNATION

| SFK | - | 3 | - | 0.8 | - | ZI |
|---|---|---|---|---|---|---|
| Type | | Panel 1 Mounting Hole Code | | Thickness Code | | Finish |

## MATERIAL AND FINISH SPECIFICATIONS

| | Threads (1) | | Fastener Materials | | | | | Standard Finishes | | | Optional Finish | | For Use in Sheet Hardness: (3) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | Internal, ASME B1.1 2B/ ASME B1.13M 6H | External, ASME B1.1 2A/ ASME B1.13M 6g | Lead-Free Carbon Steel | 300 Series Stainless Steel | CDA-510 Phosphor Bronze | Brass | Nylon, Temp. Limit 200˚ F/ 93˚ C | Passivated and/or Tested Per ASTM A380 | Electro-Plated Tin ASTM B 545, Class B With Clear Preservative Coating, annealed (4) | No Finish | Electro-Plated Tin ASTM B 545, Class B With Clear Preservative Coating, annealed (4) | Black Nitride | HRB 70 / HB 125 or Less | HRB 65 / HB 116 or Less | HRB 60 / HB 107 or Less | HRB 55 / HB 96 or Less | Aluminum, Acrylic, Castings, Polycarbonate, and PC board |
| KF2 | ▪ | | ▪ | | | | | | ▪ | | | | | | ▪ | | ▪ |
| KFS2 | ▪ | | | ▪ | | | | ▪ | | | | | ▪ | | | | ▪ |
| KFE | ▪ | | ▪ | | | | | | ▪ | | | | | | ▪ | | ▪ |
| KFSE | ▪ | | | ▪ | | | | ▪ | | | | | ▪ | | | | ▪ |
| KFB3 | ▪ | | | | | ▪ | | | ▪ | | | | | ▪ | | | ▪ |
| KSSB | | | | | | ▪ | | | | ▪ | ▪ | | | ▪ | | | ▪ |
| KFH | | ▪ | | | ▪ | | | | ▪ | | | | | | | ▪ | ▪ |
| PFK Retainer | | | | ▪ | | | | ▪ | | | | ▪ | | | | ▪ | ▪ |
| Screw | | ▪ | | ▪ | | | | ▪ | | | | ▪ | | | | | |
| Spring | | | | ▪ | | | | | | | | | | | | | |
| Retaining Ring | | | | | | | ▪ | | | | | | | | | | |
| Part Number Codes For Finishes | | | | | | | | None | ET | X | ET | BN | | | | | |

| | Threads (1) | | | Fastener Materials | | | | | Standard Finishes (2) | | | For Use in Sheet Hardness: (3) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | Miniature ISO 1501, 4H6 | Internal, ASME B1.1 2B/ ASME B1.13M 6H | External, ASME B1.1 2A/ ASME B1.13M 6g | Lead-Free Carbon Steel | Hardened Carbon Steel | 300 Series Stainless Steel | Brass | Zinc Diecast | Zinc Plated per ASTM B633, SC1 (5µm), Type III, Colorless | Electro-Plated Tin ASTM B 545, Class A With Clear Preservative Coating, annealed (4) | Bright Nickel Over Copper Flash | HRB 80 / HB 150 or less | PC board |
| SMTSO | ▪ S1 to S1.4 | ▪ 0-80 to 8-32/ M1.6 to M4 | | ▪ | | | | | | ▪ | | | ▪ |
| SMTSOB | | ▪ | | | | | ▪ | | | (6) | | | ▪ |
| SMTRA | | ▪ | | | | | | ▪ | | ▪ | | | ▪ |
| SMTPFLSM Retainer | | | | ▪ | | | | | | ▪ | | | ▪ |
| Screw | | | ▪ | | ▪ | | | | ▪ | | | | |
| Spring | | | | | | ▪ | | | | | | | |
| PSHP (5) | | | | ▪ | | | | | | | ▪ | | |
| SMTPR | | | | ▪ | | | | | | ▪ | | | ▪ |
| SFK | | | | ▪ | | | | | ▪ | | | ▪ | ▪ |
| SMTSSS | | | | ▪ | | | | | | ▪ | | | ▪ |
| SMTSK | | | | ▪ | | | | | | ▪ | | | ▪ |
| Part Number Codes For Finishes | | | | | | | | | ZI | ET | CN | | |

*(1) For plated studs, Class 2A/6g, the maximum major and pitch diameter, after plating, may equal basic sizes and can be gauged to Class 3A/6h, per ASME B1.1 Section 7, Paragraph 2 and ASME B1.13M, Section 8, Paragraph 8.2.*

*(2) See PEM Technical Support section of our web site for related plating standards and specifications.*

*(3) HRB - Hardness Rockwell "B" Scale. HB - Hardness Brinell.*

*(4) Optimal solderability life noted on packaging.*

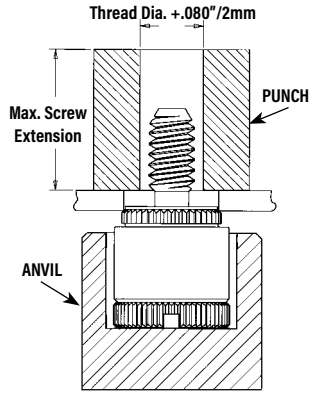
*(5) ABS cap on PSHP screw has a temperature limit of 200˚ F / 93˚ C.*

*(6) The tin deposit on type SMTSOB meets the requirements of ASTM B545, Class A and although the copper and nickel barrier layers used under the tin do not strictly comply with ASTM B545 thickness requirements they have proven effective at preventing zinc migration and providing the specified solderable shelf life.*

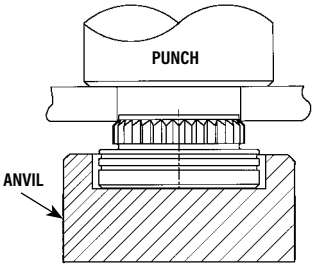
## INSTALLATION

### KF2™/KFS2™/KFE™/KFSE™/ PFK™ FASTENERS

1. Prepare properly sized mounting hole in board.
2. Place fastener into the anvil hole and place the mounting hole over the shank of the fastener as shown in drawing.
3. With installation punch and anvil surfaces parallel, apply squeezing force until shoulder contacts the board.



PFK



KF2/KFS2/ KFE/KFSE

#### PEMSERTER® Installation Tooling (1)

| Type | Thread Code | Anvil Part Number | Punch Part Number |
|---|---|---|---|
| KFE/KFSE | 440/116 -4 to -8 | 975200846300 | 975200048 |
| KFE/KFSE | 440/116 -10 to -12 | 975200847300 | |
| KFE/KFSE | 440/116 -16 to -20 | 975200848300 | |
| KFE/KFSE | 440/116 -20 to -24 | 975200882300 | |
| KFE/KFSE | M3 -3 to -6 | 975200846300 | |
| KFE/KFSE | M3 -8 to -10 | 975200847300 | |
| KFE/KFSE | M3 -12 to -14 | 975201222300 | |
| KFE/KFSE | M3 -14 to -16 | 975200848300 | |
| KFE/KFSE | 632/143 -4 to -8 | 975200849300 | |
| KFE/KFSE | 632/143 -10 to -12 | 975200850300 | |
| KFE/KFSE | 632/143 -16 to -20 | 975200851300 | |
| KFE/KFSE | 632/143 -22 to -24 | 975200883300 | |
| KFE/KFSE | 632/143 -28 to -32 | 975200884300 | |
| KFE/KFSE | 3.6 -3 to -6 | 975200849300 | 975200048 |
| KFE/KFSE | 3.6 -8 to -10 | 975200850300 | |
| KFE/KFSE | 3.6 -12 to -16 | 975200851300 | |
| KFE/KFSE | 4.2 -2 | 975201216300 | |
| KFE/KFSE | 4.2 -3 to -6 | 975201217300 | |
| KFE/KFSE | 4.2 -8 to -10 | 975201218300 | |
| KFE/KFSE | 4.2 -12 to -14 | 975201220300 | |
| KFE/KFSE | 4.2 -14 to -16 | 975201219300 | |

#### PEMSERTER® Installation Tooling (1)

| Type | Thread Code | Anvil Part Number | Punch Part Number |
|---|---|---|---|
| PFK | 440/M3 | 975200026 | 975200060 |
| PFK | 632 | 975200027 | 975200061 |

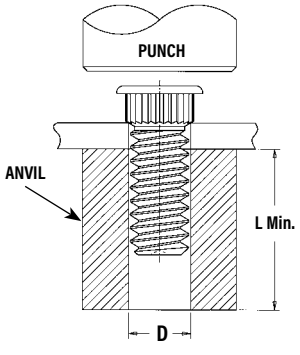
#### PEMSERTER® Installation Tooling (1)

| Type | Thread Code | Anvil Part Number | Punch Part Number |
|---|---|---|---|
| KF2/KFS2 | 080 | 8015899 | 975200048 |
| KF2/KFS2 | 256/440/M2/M2.5/M3 | 975200904300 | |
| KF2/KFS2 | 632/M3.5 | 975200035 | |
| KF2/KFS2 | 832/M4 | 975200037 | |
| KF2/KFS2 | 032/M5 | 975200905300 | |

*(1) Click here for a quote on Haeger® custom installation tooling.*

### KSSB™/KFH™ FASTENERS

1. Prepare properly sized mounting hole in board.
2. Place fastener into mounting hole as shown.
3. With installation punch and anvil surfaces parallel, apply squeezing force until head contacts the board.

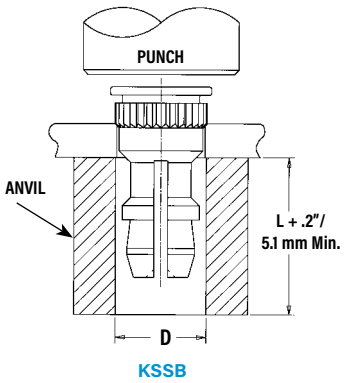


KFH

#### PEMSERTER® Installation Tooling (1)

| Part Number | D +.003" -.000" | Punch Part No. | Anvil Part No.* |
|---|---|---|---|
| KFH-440-L | .113" | 975200048 | 970200006300 |
| KFH-632-L | .140" | | 970200007300 |
| KFH-832-L | .166" | | 970200008300 |
| KFH-032-L | .191" | | 970200009300 |

| Part Number | D +0.08mm | Punch Part No. | Anvil Part No.* |
|---|---|---|---|
| KFH-M3-L | 3.1mm | 975200048 | 970200229300 |
| KFH-M4-L | 4.1mm | | 970200019300 |
| KFH-M5-L | 5.1mm | | 970200008300 |



KSSB

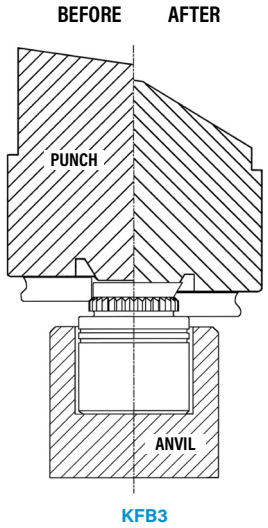
#### PEMSERTER® Installation Tooling (1)

| Part Number | D +.003" -.000"/ +0.08mm | Punch Part No. | Anvil for material .050" / 1.27mm to .065" / 1.65mm | Anvil for material greater than .065" / 1.65mm |
|---|---|---|---|---|
| KSSB-156-L | .216" | 975200048 | 8022167 | 970200015300 |
| KSSB-4mm-L | 5.49mm | | | |

*(1) Click here for a quote on Haeger® custom installation tooling.*

## KFB3™ FASTENERS

1. Prepare properly sized mounting hole in board.
2. Place fastener into the anvil hole and place the mounting hole over the shank of the fastener as shown in diagram.
3. Using a punch flaring tool and a recessed anvil, apply squeezing force until the shoulder of the fastener contacts the board. As the fastener seats itself in the proper position, the punch tool will flare the extended portion of the shank outward to complete the installation. The combination of broaching and flaring provides high pushout performance.



KFB3

### PEMSERTER® Installation Tooling (1)

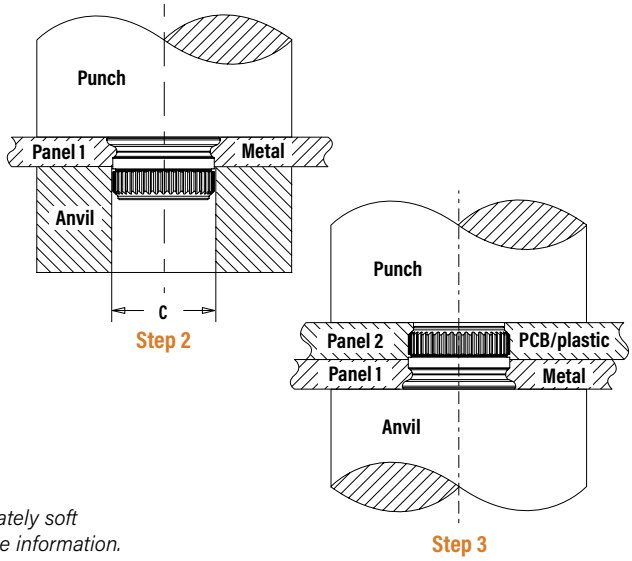
| Thread Code | Length Code | Anvil | Punch (Flaring Tool) |
|---|---|---|---|
| #4-40 | -2 | 975201213300 | 975201231400 |
| #4-40 | -4 to -8 | 975200846300 | |
| #4-40 | -10 to -12 | 975200847300 | |
| #4-40 | -16 to -20 | 975200848300 | |
| #4-40 | -20 to -24 | 975200882300 | |
| #6-32 | -2 | 975201215300 | 975201232400 |
| #6-32 | -4 to -8 | 975200849300 | |
| #6-32 | -10 to -12 | 975200850300 | |
| #6-32 | -16 to -20 | 975200851300 | |
| #6-32 | -22 to -24 | 975200883300 | |
| #6-32 | -28 to -32 | 975200884300 | |

| Thread Code | Length Code | Anvil | Punch (Flaring Tool) |
|---|---|---|---|
| M3 | -2 | 975201213300 | 975201231400 |
| M3 | -3 to -6 | 975200846300 | |
| M3 | -8 to -10 | 975200847300 | |
| M3 | -12 to -14 | 975201222300 | |
| M3 | -14 to -16 | 975200848300 | |
| M4 | -2 | 975201216300 | 975201221400 |
| M4 | -3 to -6 | 975201217300 | |
| M4 | -8 to -10 | 975201218300 | |
| M4 | -12 to -14 | 975201220300 | |
| M4 | -14 to -16 | 975201219300 | |

*(1) PennEngineering manufactures and stocks the installation tooling for KFB3 fasteners. Click here for a quote on Haeger® custom installation tooling.*

## SFK™ FASTENERS

**Step 1.** Prepare properly sized mounting hole in both panels.
**Step 2.** Using only Panel 1, with the punch and anvil surfaces parallel, apply squeezing force until the fastener is flush with the top of Panel 1.
**Step 3.** Place Panel 2 over fastener and apply squeezing force.




### PEMSERTER® Installation Tooling (1)

| Size | C ±0.13/±.003 (mm) / (in.) | Punch Part No. | Anvil Part No.* |
|---|---|---|---|
| SFK-3 | 3.05 / .120 | 975200048 | 970200229300 |
| SFK-5 | 5.05 / .199 | 975200048 | 970200020300 |

** Part number for anvil used in Step 2*

***NOTE:*** *Fastener can be installed in both sheets at once when metal panel is adequately soft compared to the non-metal panel. E-mail techsupport@pemnet.com for more information.*

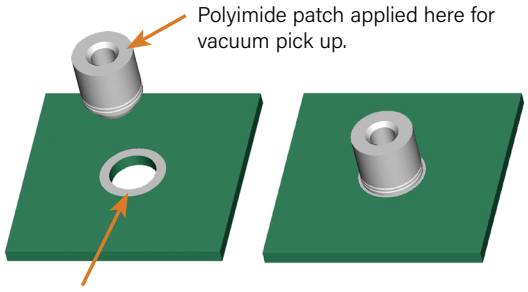
*(1) Click here for a quote on Haeger® custom installation tooling.*

**INSTALLATION NOTES**

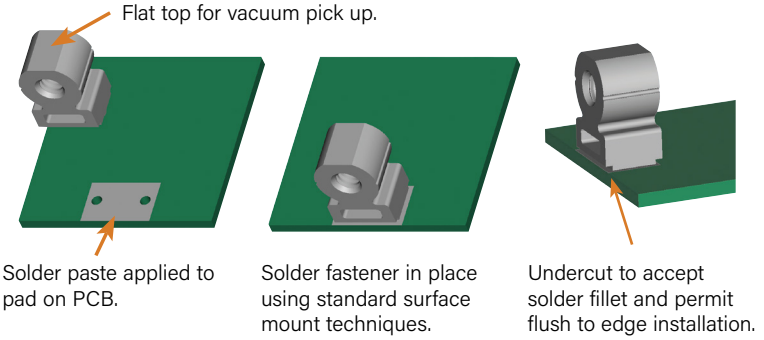
- For best results we recommend using a HAEGER® or PEMSERTER® machine for installation of PEM® self-clinching fasteners. Please check our website for more information.
- Visit the Animation Library on our website to view the installation process for select products.

## INSTALLATION

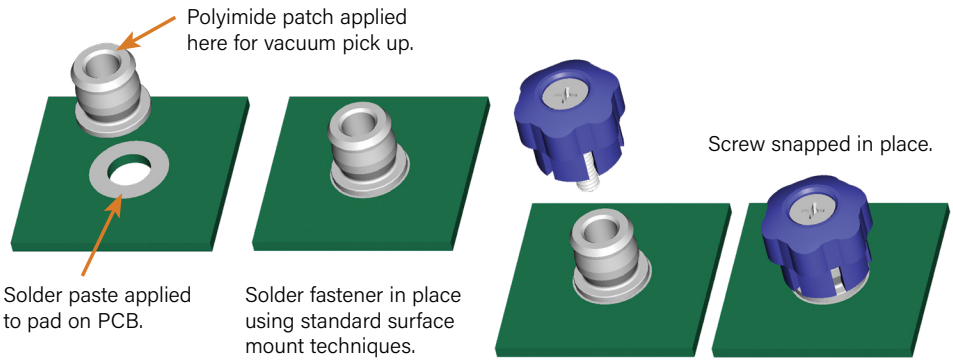
### SMTSO™ NUTS AND STANDOFFS



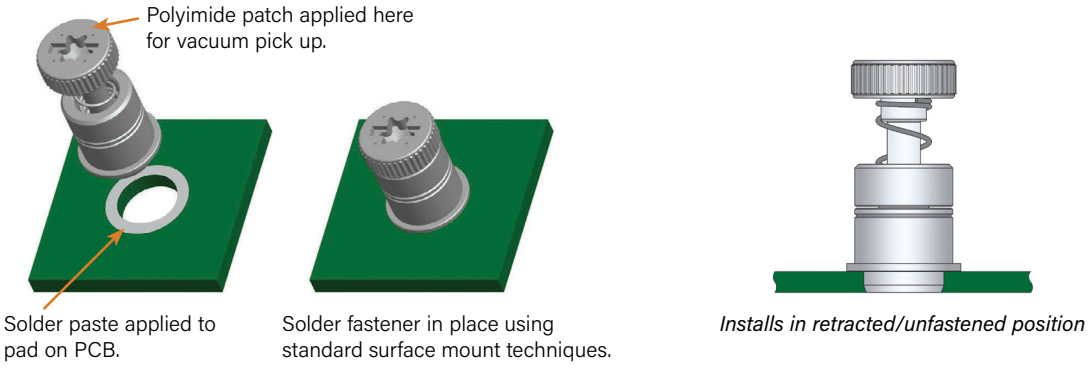

### SMTRA™ R'ANGLE® FASTENERS



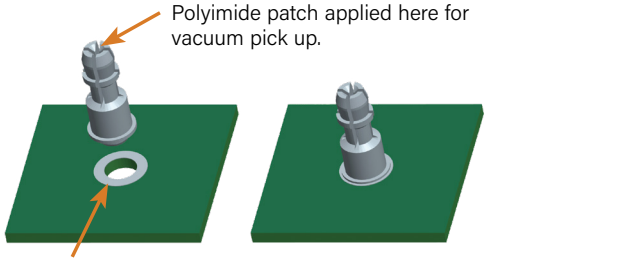

### SMTPF™ CAPTIVE PANEL SCREWS



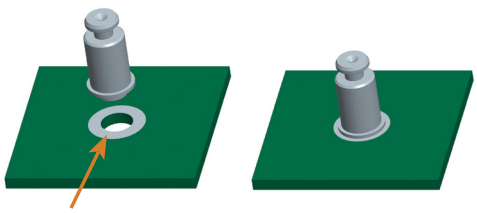

### SMTPFLSM™ CAPTIVE PANEL SCREWS



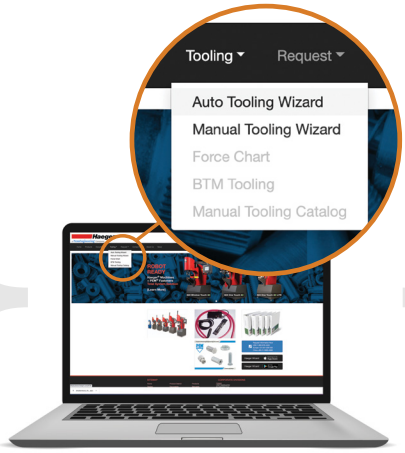

### SMTSS™ STANDOFFS




### SMTSK™ STANDOFFS



# For Additional HAEGER® and PEMSERTER® Tooling Information / Part Numbers

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## PERFORMANCE DATA(1)

### KF2™/KFS2™/KFE™/KFSE™/KFB3™/KFH™/PFK™ BROACHING AND BROACH/FLARE MOUNT FASTENERS

| | Type | Thread Code | Max. Nut Tightening Torque (in. lbs.) | Test Sheet Thickness & Test Sheet Material | Installation (lbs.) | Pushout (2) (lbs.) | Torque-out (in. lbs.) | Rated Current Amps (5) |
|---|---|---|---|---|---|---|---|---|
| UNIFIED | KF2, KFS2 KFE, KFSE | 256 | (3) | .060" FR-4 Panel | 400 | 60 | 6 | – |
| | | 440 | (3) | .060" FR-4 Panel | 400 | 65 | 15 | – |
| | | 632 | (3) | .060" FR-4 Panel | 500 | 80 | 30 | – |
| | | 832 | (3) | .060" FR-4 Panel | 700 | 95 | 35 | – |
| | | 032 | (3) | .060" FR-4 Panel | 700 | 100 | 40 | – |
| | KFB3 | 440 | (3) | .060" FR-4 Panel | 1,000 | 140 | 18 | – |
| | | 632 | (3) | .060" FR-4 Panel | 1,500 | 170 | 28 | – |
| | KFH | 440 | 4 | .060" FR-4 Panel | 400 | 65 | 7 | 14 |
| | | 632 | 8 | .060" FR-4 Panel | 400 | 70 | 11 | 19 |
| | | 832 | 15 | .060" FR-4 Panel | 400 | 80 | 16 | 24 |
| | | 032 | 18 | .060" FR-4 Panel | 400 | 90 | 17 | 30 |
| | PFK | 440 | (3) | .060" FR-4 Panel | 250 | 55 | (3) | – |
| | | 632 | (3) | .060" FR-4 Panel | 400 | 60 | (3) | – |

| | Type | Thread Code | Max. Nut Tightening Torque (N·m) | Test Sheet Thickness & Test Sheet Material | Installation (kN) | Pushout (2) (N) | Torque-out (N·m) | Rated Current Amps (5) |
|---|---|---|---|---|---|---|---|---|
| METRIC | KF2, KFS2 KFE, KFSE | M2 | (3) | 1.5 mm FR-4 Panel | 2.2 | 267 | 0.68 | – |
| | | M3 | (3) | 1.5 mm FR-4 Panel | 2.2 | 290 | 1.7 | – |
| | | M4 | (3) | 1.5 mm FR-4 Panel | 2.2 | 420 | 3.4 | – |
| | | M5 | (3) | 1.5 mm FR-4 Panel | 2.9 | 440 | 4.5 | – |
| | KFB3 | M3 | (3) | 1.5 mm FR-4 Panel | 4.4 | 560 | 2.03 | – |
| | | M4 | (3) | 1.5 mm FR-4 Panel | 6 | 680 | 3.2 | – |
| | KFH | M3 | 0.45 | 1.5 mm FR-4 Panel | 1.8 | 285 | 0.79 | 15 |
| | | M4 | 1.6 | 1.5 mm FR-4 Panel | 1.8 | 355 | 1.8 | 23 |
| | | M5 | 2.1 | 1.5 mm FR-4 Panel | 1.8 | 400 | 1.92 | 32 |
| | PFK | M3 | (3) | 1.5 mm FR-4 Panel | 1.1 | 245 | (3) | – |

### KSSB™ BROACHING SNAP-TOP® STANDOFFS

| | Type | Panel 1 (.060" FR-4 Fiberglass) (4) | | Panel 2 (Removable) (4) | | |
|---|---|---|---|---|---|---|
| | | Installation (lbs.) | Pushout (lbs.) | Max. First On Force (lbs.) | Min. First Off Force (lbs.) | Min. 15th Off Force (lbs.) |
| UNIFIED | KSSB | 500 | 110 | 13 | 3.0 | 1.0 |

| | Type | Panel 1 (1.5 mm FR-4 Fiberglass) (4) | | Panel 2 (Removable) (4) | | |
|---|---|---|---|---|---|---|
| | | Installation (kN) | Pushout (N) | Max. First On Force (N) | Min. First Off Force (N) | Min. 15th Off Force (N) |
| METRIC | KSSB | 2.2 | 484 | 57.7 | 13.3 | 4.4 |

***(1) Published installation forces are for general reference. Actual set-up and confirmation of complete installation should be made by observing proper seating of fastener as described in the installation steps. Other performance values reported are averages when all proper installation parameters and procedures are followed. Variations in mounting hole size, sheet material, and installation procedure may affect performance. Performance testing this product in your application is recommended. We will be happy to provide technical assistance and/or samples for this purpose.***

*(2) These are typical values for parts installed in drilled mounting holes. Punched mounting holes yield values approximately 15% less.*

*(3) Not applicable.*

*(4) See Application Data drawing on page 8.*

*(5) The maximum carrying current for each of the above fasteners is calculated based on a heat transfer coefficient of 20 W/m² °K and a maximum temperature rise of 15°C / 27°F above ambient.*

## SFK™ SpotFast® CLINCH/BROACH MOUNT FASTENERS

| Type and Size | Thick-ness Code | Installation into Panel 1 Cold-rolled Steel | | Installation into Panel 2 FR-4 Fiberglass | | Pushout of Panel 2 (3) | |
|---|---|---|---|---|---|---|---|
| | | kN | lbs. | kN | lbs. | N | lbs. |
| SFK-3 | 0.8 | 6.2 | 1400 | 1.8 | 400 | 200 | 45 |
| SFK-3 | 1.0 | 8 | 1800 | 1.8 | 400 | 200 | 45 |
| SFK-3 | 1.2 | 8.9 | 2000 | 1.8 | 400 | 200 | 45 |
| SFK-3 | 1.6 | 10.2 | 2300 | 1.8 | 400 | 200 | 45 |
| SFK-5 | 0.8 | 11.1 | 2500 | 1.8 | 400 | 400 | 90 |
| SFK-5 | 1.0 | 13.5 | 3000 | 1.8 | 400 | 400 | 90 |
| SFK-5 | 1.2 | 15.6 | 3500 | 1.8 | 400 | 400 | 90 |
| SFK-5 | 1.6 | 17.8 | 4000 | 1.8 | 400 | 400 | 90 |

## SMTSO™/SMTSOB™ FASTENERS(1)(2)

| Type | Thread/ Thru-hole Code | Test Sheet Material - .062" Single Layer FR-4 Pushout (lbs.) | Pushout (N) | Torque-out (in. lbs.) | Torque-out (N·m) | Rated Current Amps (6) |
|---|---|---|---|---|---|---|
| SMTSO | 080 | 85.1 | 378.7 | 4.94 | 0.56 | 11 |
| SMTSOB | | | | | | — |
| SMTSO | 256 | 56.5 | 251 | 8.56 | 1 | 25 |
| SMTSOB | | | | | | 40 |
| SMTSO | 440 | 56.5 | 251 | 8.56 | 1 | 22 |
| SMTSOB | | | | | | 36 |
| SMTSO | 632 | 93.5 | 416 | 13.83 | 1.6 | 34 |
| SMTSOB | | | | | | 55 |
| SMTSO | 832 | 151.1 | 672 | 26.96 | 3 | 47 |
| SMTSOB | | | | | | 76 |
| SMTSO | 116 | — | — | — | — | 22 |
| SMTSOB | | | | | | 37 |
| SMTSO | 143 | — | — | — | — | 33 |
| SMTSOB | | | | | | 55 |
| SMTSO | M1 | 85.1 | 378.7 | 4.94 | 0.56 | 11 |
| SMTSOB | | | | | | — |
| SMTSO | M1.2 | 85.1 | 378.7 | 4.94 | 0.56 | 10 |
| SMTSOB | | | | | | — |
| SMTSO | M1.4 | 85.1 | 378.7 | 4.94 | 0.56 | 10 |
| SMTSOB | | | | | | — |
| SMTSO | M1.6 | 85.1 | 378.7 | 4.94 | 0.56 | 10 |
| SMTSOB | | | | | | — |
| SMTSO | M3 | 56.5 | 251 | 8.56 | 1 | 22 |
| SMTSOB | | | | | | 36 |
| SMTSO | M3.5 | 93.5 | 416 | 13.83 | 1.6 | 34 |
| SMTSOB | | | | | | 55 |
| SMTSO | M4 | 151.1 | 672 | 26.96 | 3 | 47 |
| SMTSOB | | | | | | 76 |
| SMTSO | 3.1 | — | — | — | — | 22 |
| SMTSOB | | | | | | 36 |
| SMTSO | 3.6 | — | — | — | — | 33 |
| SMTSOB | | | | | | 55 |
| SMTSO | 4.2 | — | — | — | — | 46 |
| SMTSOB | | | | | | 75 |

## SMTSS™ ReelFast® SNAP-TOP® STANDOFFS(1)(2)

| Type, Material and Size | Panel 1 (Bottom) Test Sheet Material | Pushout | Panel 2 (Top) Max. Snap-on Force |
|---|---|---|---|
| SMTSSS-156 | .062" Single Layer FR-4 | 113 lbs. | 20 lbs. |
| SMTSSS-4MM | 1.58 mm Single Layer FR-4 | 500 N | 89 N |

## SMTSK™ KEYHOLE® STANDOFFS(1)(2)

| Type and Size | Panel 1 (Bottom) Test Sheet Material | Pushout |
|---|---|---|
| SMTSK-6060 | .062" Single Layer FR-4 | 113 lbs. |
| SMTSK-61.5 | 1.58 mm Single Layer FR-4 | 500 N |

## SMTRA™ R'ANGLE® FASTENERS(1)(2)

| | Part Number | Test Sheet Material - .062" Single Layer FR-4 Pushout (lbs.) | Side Load (lbs.) |
|---|---|---|---|
| UNIFIED | SMTRA256-8-6 | 51.7 | 7.1 |
| | SMTRA440-9-6 | 89.5 | 10.8 |
| | SMTRA632-10-8 | 110.3 | 8.4 |
| | SMTRA832-12-9 | 137.2 | 21.2 |

| | Part Number | Test Sheet Material - 1.58 mm Single Layer FR-4 Pushout (N) | Side Load (N) |
|---|---|---|---|
| METRIC | SMTRAM2-6-5 | 418.2 | 56.8 |
| | SMTRAM25-6-5 | 216.5 | 36.9 |
| | SMTRAM3-7-5 | 257.6 | 41.3 |
| | SMTRAM4-9-7 | 369.3 | 73.3 |

## SMTPFLSM™ FASTENERS(1)

| | Type and Thread Size | Min. Tensile Strength (lbs.) | Rec. Tightening Torque (in. lbs.) (4) | Test Sheet Material .060" P.C. Board Pull-off (lbs.) (5) |
|---|---|---|---|---|
| UNIFIED | SMTPFLSM-440 | 556 | 4.4 | 100 |
| | SMTPFLSM-632 | 724 | 7.0 | 105 |

| | Type and Thread Size | Min. Tensile Strength (N) | Rec. Tightening Torque (N·m) (4) | Test Sheet Material 1.5 mm P.C. Board Pull-off (N) (5) |
|---|---|---|---|---|
| METRIC | SMTPFLSM-M3 | 2900 | 0.61 | 445 |
| | SMTPFLSM-M3.5 | 3269 | 0.8 | 465 |

## SMTPR™ RETAINERS(1)

| Part Number | Test Sheet Material - .062" Single Layer FR-4 Pushout (lbs.) | Pushout (N) |
|---|---|---|
| SMTPR-6-1ET | 161.4 | 718 |

### TESTING CONDITIONS FOR SURFACE MOUNTED FASTENERS

| | | | |
|---|---|---|---|
| **Oven** | Quad ZCR convection oven w/ 4 zones | **Spokes** | 2 Spoke Pattern |
| **High Temp** | 473˚F / 245˚C | **Paste** | Amtech NC559LF Sn96.5/3.0Ag/0.5Cu (SAC305) **(SMTSO, SMTRA, SMTPR)** |
| **Board Finish** | 62% Sn, 38% Pb | | Alpha CVP-390 Sn96.5/3.0Ag/0.5Cu (SAC305) **(SMTPFLSM, SMTSS, SMTSK)** |
| **Screen Printer** | Ragin Manual Printer | **Stencil** | .0067" / 0.17 mm thick **(SMTSO, SMTRA, SMTPR, SMTSS, SMTSK)** |
| **Vias** | None | | .005" / 0.13 mm thick **(SMTPFLSM)** |

*(1) With lead-free paste. Average values of 30 test points. The data presented here is for general comparison purposes only. Actual performance is dependent upon application variables. We will be happy to provide samples for you to install. If required, we can also test your installed hardware and provide you with the performance data specific to your application.*

*(2) Further testing details can be found in our website's literature section.*

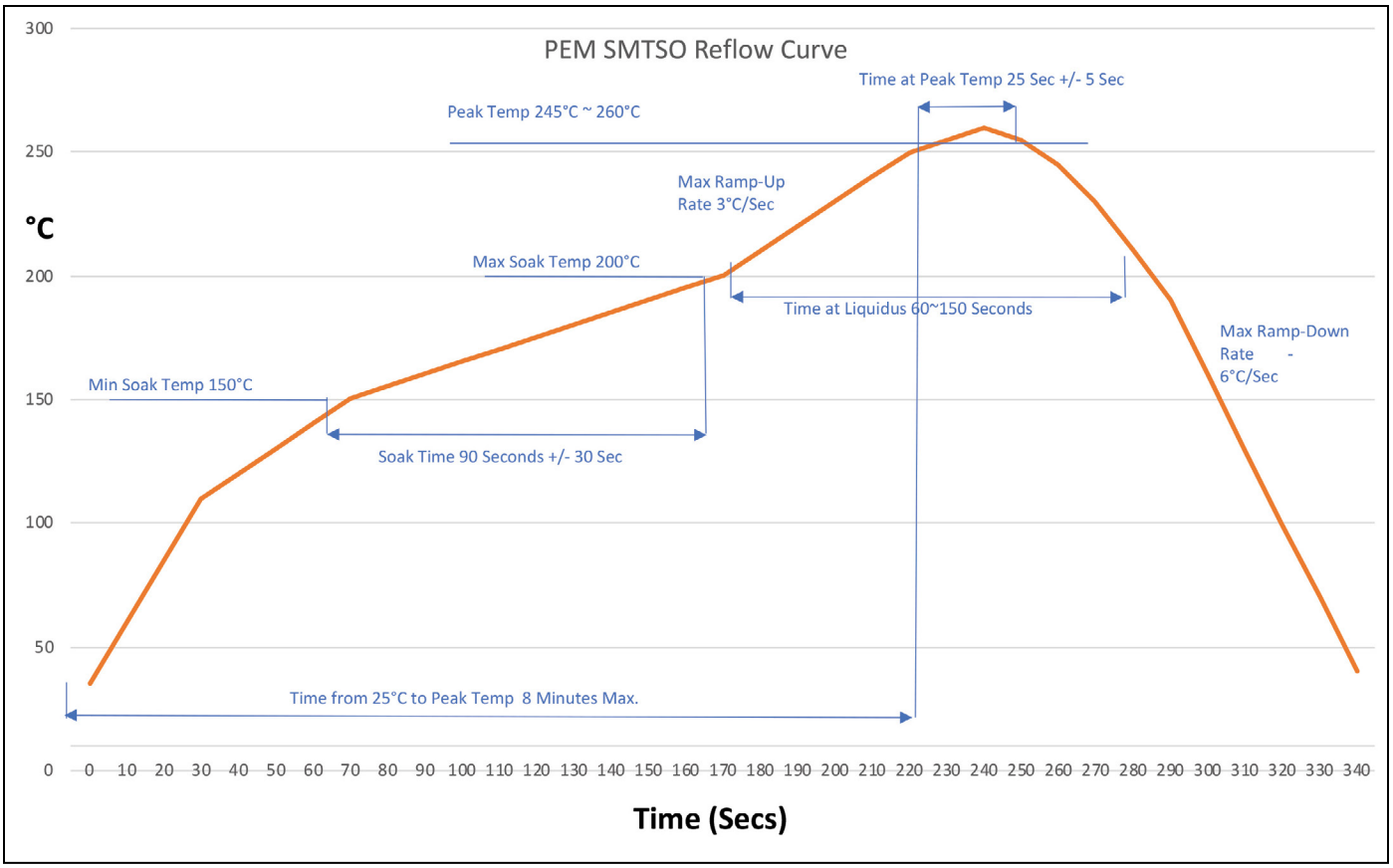
*(3) In most applications, pullout strength of the SFK fastener in Panel 1 exceeds pushout strength of Panel 2.*

*(4) Torque values shown will produce a preload of 70% minimum tensile with a nut factor "k" equal to .1.*

*(5) Failure occurred at the solder joint. Screw retention strength is greater than the retainer.*

*(6) The maximum carrying current for each of the above fasteners is calculated based on a heat transfer coefficient of 20 W/m² °K and a maximum temperature rise of 15°C / 27˚F above ambient.*

## SMTSO™ REFLOW CURVE



## OTHER FASTENERS FOR CONSIDERATION TO USE WITH PC BOARDS

### PF11MW™ FLOATING CAPTIVE PANEL SCREWS

**(See PEM® Bulletin PF)**

Unique flare mount feature allow fasteners to "float" in mounting hole.

- Compensates for mating thread misalignment.
- Installs into any panel material.
- Appropriate for close center-line-to-edge applications.
- Color coded knobs available.


### PF11MF™ FLARE-MOUNTED CAPTIVE PANEL SCREWS

**(See PEM® Bulletin PF)**

- Appropriate for close centerline-to-edge applications.
- Doesn't require high installation force.
- Installs into any panel material.
- Installs flush on back side of panel.
- Color coded knobs available.


### SGPC™ SWAGING COLLAR STUDS

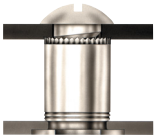
**(See PEM® Bulletin FH)**

- Can be installed into most materials, including stainless steel and rigid non-metallic panels.
- Can be used to attach dissimilar materials.
- Can accommodate multiple panels as long as the total thickness does not exceed the maximum sheet thickness.
- Appropriate for close center-line-to-edge applications.


### SOAG™/SOSG™ GROUNDING STANDOFFS

**(See PEM® Bulletin SO)**

- Designed for clinching into steel or aluminum chassis.
- "Gripping teeth" on opposite side of standoff makes firm electrical contact with mating PC Board.




### SKC™ KEYHOLE® STANDOFFS

**(See PEM® Bulletin SK)**

- Clinch feature mounts fastener permanently into metal sheet.
- Allows for quick attachment and detachment of PC Board.
- Head is flush or sub-flush in metal sheet.
- Makes horizontal or vertical component mounting possible.


### SSA™/SSC™/SSS™ SNAP-TOP® STANDOFFS

**(See PEM® Bulletin SSA)**

- Spring action holds PC Boards and subassemblies securely, while allowing for quick removal.
- Screws and other threaded hardware are eliminated.


***For more information on these and other PEM products, visit our PEMNET™ Resource Center at www.pemnet.com***

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